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CANADIAN PSYCHIATRIC ASSOCIATION JOURNAL

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Canadian Psychiatric Association Journal

Vol. 3

Ottawa, Canada, January 1958

No. 1

OF BIRDS, BATS AND BEES A Study of Schizophrenic Thought Disorder

K. A. YONGE, M.D., C.M., D.P.M.*

It is in his ability to think about thinking that man regards himself as unique in the animal kingdom. It is not simply in his ability to think that he can claim uniqueness, although he is vastly superior. Animals show their ability to associate one past experience with another and, as a result, to arrive at some plan of action. The rat learning his way through the maze, the chimpanzee figuring out a means to obtain the food out of arms reach, the dog herding the sheep—this, for purposes of this paper, is evidence of thinking. But man can think about thinking.

And, for centuries, he has wondered how he does it (1,2,3)—wondered by what processes he links thoughts together in a meaningful sequence, in quite a variety of different sequences—all more or less logical. Much depends on how he *associates* one thought with the next. This field of inquiry—clumsily called “associationism” (4,5)—is of particular interest to the psychiatrist and others who seek to gain a better understanding of schizophrenic patients. This paper, in reviewing some of the processes of association, is intended to be a contribution to the understanding of thought disorder, as we commonly use the term in connection with schizophrenia.

We can start by looking at this rather exotic title. Why birds, bats and bees linked together? What associations are involved? And what impressions or ideas become linked together in an associative sequence with each as a stimulus word? That is, what line of ideas does “birds” alone conjure up, or “bats” alone, or “bees”? And are there any cross-connections between these three separate chains of associations?

First of all, and most obviously, we can say that these three words run together readily because of a certain similarity in their sound. They make an alliteration. They are associated by assonance. There is a certain appeal in linking like sounds together—a certain associative tendency, of the order of poetry. Birds, bats and *wasps* would not do nearly as well. There is plenty of similarity between a bee and a wasp, of course, but as far as sound appeal is concerned, it is bees, not wasps, that have to be associated with the birds and bats. So *one* way in which words may be associated is simply by similarity in sound. It does not depend on the meaning of the words. There is little that could be called logic in this association, but it has an associative force nevertheless.

But there is another way—another *obvious* way—in which birds, bats and bees are associated. This depends, to a limited extent, on the meaning of the words—on the characteristics of the objects which the words represent. They are all creatures of flight. So they are associated not simply because there is a similarity in the words themselves but also because there is a similarity in the objects which the words represent. We might call this similarity in figure-function—figure being the object represented by the word and function denoting some behavioral characteristic of the object. “Birds, bats and *baboons*” would not do for this. “Baboons” has some similarity in sound, but baboons do not fly. Now there is a little more logic in associating things according to their meaning by similarity of function. It is an association that you can make only

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by experience—by learning that all these creatures fly. But it is still not very far-reaching. It seems to have little to do with linking up a whole long chain of associated ideas, as we do in logical thinking.

So we look for other associative links between our birds, bats and bees. Each of these words has a familiar metaphorical connotation which is common to the others. We do not have to look far to see it. Three of the common metaphors that are used for the insane—people with a disorder of thinking—are “away with the *birds*”, “*bats* in the belfry” and “*bees* in the bonnet”. (There are some others and we will come to these in a moment). So quite apart from the superficial, first order associations through similarity in sound and in figure-function of these three, there is a more subtle second order association depending on meaning—the metaphorical or symbolic meaning. They have it in common then that they can imply “craziness” and this allows me to justify my title which associates birds, bats and bees with thought disorder.

But that is not all. Why do we commonly use these particular metaphors—metaphors of creatures of flight—when we talk of thought disorder? Is there a deeper significance in the association? Why did Shakespeare, who used animal imagery so profusely, bring in his creatures in certain characteristic clusters?

The crow, the beetle and the mouse, for example, frequently appear together. This occurs when death or drug-induced sleep are contemplated. Macbeth (6) brings crows and beetles into his speech as he prepares for murder. Edgar, reasoning with the Earl of Gloucester (7), as he contemplates suicide from the Cliffs of Dover, sees crows (where sea-gulls habitually belong) looking at such a distance like *beetles*, and men below looking like *mice*. When Horatio reasons with the distracted Hamlet (8) on the same White Cliffs “the dreadful summit of the cliff that *beetles* o’er its base into the sea”, he introduces the ominous association as a verb. Similarly, Oberon (9) brings the crow in as a verb (“ere the first cock crow”) and, though a change of scene separates it, it is closely followed by mice and beetles as Oberon prepares to squeeze the fateful potion on Titania’s eyelids.

The black crow, the black beetle seem appropriately garbed as harbingers of disaster and death. The mouse seems to gain entry into this sombre company by association with the rere-mouse—the bat which, “in folk-lore is the symbol of the black-hooded figure who has the last word in the drama of life” (10). Whether crow or beetle is a noun or a verb, whether crows rather than sea-gulls really frequent the Cliffs of Dover—these are of little consequence compared with their function of creating by association, albeit unconsciously, the appropriately sinister atmosphere.

Armstrong (10) presents a full and fascinating study of the psychology of association in his “Shakespeare’s Imagination”—“It is not credible”, he says, “that the poet was fully aware of the strange frolics of his images as they changed partners like children in a game or dance, some dropping out to come in again later, or perhaps, joining up with another group. . . . The adventures of the kite, beetle and drone . . . suggest that we may postulate below the level of consciousness an active and subtle organizing principle. The more closely Shakespeare’s works are studied the more numerous such groups of images as these are found to be. They are not sporadic peculiarities but constant features of the poet’s thought. . . . I would suggest that the grouping of images into what I call “image clusters” betokens the work of a subliminal organizing principle linked to some degree with emotion”.

Shakespeare puts birds, bats and bees in different associative clusters. What is the significance of *our* clustering them in relation to thought disorder? Why

do we use as images the creatures of flight? I shall suggest an answer. In the slow course of evolution creatures developed flight evidently as an escape from annihilation either at the hands of their fellow creatures or through famine, drought or freezing, as a means of "getting away from it all" when "down to earth" affairs were too intolerable. Yet the flying creatures are not altogether removed from the earth. They all live essentially on the earth. Their sustenance for life is obtained on the ground, or thereabouts. They almost always have to come down to earth for reproduction.

But the creatures of flight so have it that their contact with terra firma is intermittent. Anybody who had no concept of flight as a means of progression would be very baffled by seeing tracks of a bird here and there on the sand with no intervening train of footmarks which he could follow. He would have great difficulty in seeing any reasonable connection—any association—between them. Only when he embraces the concept of flight does this make sense at all.

And it is creatures of flight that we have chosen as our common symbols of insanity. The reason, surely, is that it implies a way of getting from one place to another—from one thought to another—which is less obvious; it implies a way of associating ideas which are not confined to the plodding processes of customary logic. Flight is not at all disorganized. It seems disconnected only as far as contact with the ground is concerned. We must not necessarily conclude that schizophrenic thought is disorganized. It seems disconnected only as far as customary logic is concerned.

But what about the other common metaphors that we use to denote thought disorder? Do they have a similar connotation—one that has to do with disconnection? We refer to the mentally sick as being "nuts", as being "cracked", as "having a screw loose" or as being "bugs". "Cracked" certainly suggests a break in connection: "screw-loose" implies at least, a loose connection; as for "nuts" this may be associated with being cracked as nuts, or with screws, bolts and nuts as gadgets for connecting things together—probably the former. But how about "bugs"? Curiously enough, the word "bug" comes from the old Welsh—a word meaning hob-goblin, an evil kind of fairy. And that is as fitting a creature as you would want. Altogether, then, it can be argued that these several metaphors which we frequently choose colloquially to denote thought disorder have in common the idea of discontinuity or intermittent contact. And this is evidently what happens to the patient with schizophrenic thought disorder. While it may seem that he has lost his ability to form associations, it would be more true to say that he is using a different kind of progression.

Bleuler (11) recognized this as the first and most important of the fundamental symptoms of schizophrenia. "In this malady the associations lose their continuity". Then he qualifies this by saying—"the associations tend to proceed along new lines". There is a better word than "new" for this, because "new" implies that "something new has been added", as if it were not present in the individual before. Anyway, he went on to account for many of the accessory symptoms on the basis of this fundamental disorder. And there is much to be said for regarding his other two fundamental symptoms (the ambivalence and the changes in affect) as extensions of the first. So the change in associations seems to be the one essential fundamental disorder.

It seems that Bleuler might have gone a lot further than he did if he had taken more into account the theory of association which was much to the fore in his day and had been debated on and off for centuries before.

The fundamental "Laws of Association" proposed by Aristotle (12)—the laws of contiguity, similarity and contrast—had been well worked upon by

successive generations of philosophers and then later on, in the 19th century, by the experimental psychologists. They had added and subtracted all kinds of elaborations without being able substantially to better Aristotle's insights—that impressions become linked in association 1) because they happened to occur together on one or more occasions, 2) because of an evident similarity between them or, 3) because they represented opposite poles in a natural axis, light-darkness, day-night, male-female, love-hate, and so on. But these philosophical arguments and psychological tests did serve to confirm the "laws" and to enlarge their meaning. David Hume (13), for example, had difficulty in accepting Aristotle's law of contrast, and proposed, as a substitute, the law of cause and effect—by which we are inclined to forge an associative link between impressions when there is a casual relationship between them. We associate smoke with fire because fire *causes* smoke. We associate hang-over with alcohol because alcohol *causes* hang-overs. But it seems that Hume's point is nothing but an extension of Aristotle's contiguity and that the law of contrast deserves its place. James Mill (14) aimed at simplification and he reduced all the laws of association to the single law of contiguity—the law that says we forge associations between objects, ideas or events because they happened to occur together. Then he made the useful contribution of distinguishing between events that are synchronous and events that are successive. We associate the sound of crackling with flames because they occur synchronously. We associate fire with ashes because we have learned that it so regularly happens that one follows the other. And it is not long, of course, before we recognize a causal association—which greatly strengthens the associative link—all within the law of contiguity. Thomas Brown (15) stressed that different associations had varying degrees of tenacity and tried to determine what it was that made certain associations stronger than others. In this pursuit he defined nine so-called "secondary laws of association".

Herbert Spencer (16), noted for his argument which gave the law of similarity primacy over the law of contiguity, was inclined to give the established laws a new look. He revised his psychology in keeping with the publication in 1859 of Darwin's—"The origin of the Species". To be up-to-date he included "evolutionary association" and then upheld it as the greatest of the laws of association.

When the experimental psychologists, notably Thorndyke (17), extended the field of inquiry, they were inclined to move away from the looser sociological and psychological connotations of associationism and coined another name—"connectionism". What they seemed to be trying to do was to give the old established theories a new look by relating them more closely to neuro-physiology. "Connection"—with a sense of neural connections—had a more definite ring than "associations". But their experiments led them to essentially the same conclusions—the laws of contiguity and similarity, though they had less to say about contrast. Jung made a major contribution in the form of his word association test in the exploration of the unconscious thought processes involved.

What seems to be lacking is the appreciation that the different laws of association evolve in a phylogenetic sequence. Perhaps because of the lack of this appreciation, the theories of association have been rather sterile in the overall progress of psychology. It is fairly clear that some of the associative forces are characteristic of the early or primitive stages of development while others develop only in the later or more mature stages. An appreciation of this sequence seems to be of considerable clinical importance. It seems to lead to a much better understanding of the "logic" in schizophrenic thinking—the "paralogical" thinking. The thinking of a schizophrenic is probably not disconnected

at all, although the connections are certainly unusual according to our highly developed ways of thinking.

Each of the three primary laws of association lends itself to successive stages of development, from the simplest to the most complex. Apart from that, associations by similarity are, on the whole, more simple, elementary and probably the most primitive. It does not take much brain power to associate one object with another simply because they look, sound, smell, taste or feel alike. The infant soon learns to recognize his mother's face, and a different face will not do because it does not look similar. He soon learns to recognize the feeding bottle for no better reason than that he has seen one like it before; although it is not long before he begins to recognize it with more meaningful associations. It is at a most elementary level that associations by similarity, such as those between the different orifices of the body—simply as orifices—has left our society perplexed and embarrassed by the readiness with which people can transfer their sexual inclinations from one to the other—and never entirely eliminating the mouth.

In the early stages, the law of similarity readily operates at the level of simple sense perceptions. There is need only for a minimum of previous experience. There need be no investment of meaning—nothing that you could call "logic". It pertains to a later stage of development for association by similarity to involve the meaning of things. At first, if one object looks like another, if one sound resembles another, an association is forged, quite apart from any figurative meaning that may connect them. So, in the early stages, associations by similarity are based on sense perceptions. Thinking as such is concrete. It is—to use Goldstein's words (18)—"of an unreflective character . . . confined to the immediate apprehension of the given thing or situation in its particular uniqueness . . . directed by the immediate claims which one particular aspect of the object or . . . situation makes".

Do we not see the severely schizophrenic patient thinking at this elementary level—associating impressions by similarity of sound or configuration? Clang associations are characteristic. Some of them are simple—head-bed, sad-mad-bad, —some are rather more subtle; for example, the patient who said "I am a shark-fish", in response to hearing "fish market". She picked the "ark" of "market" and carried over the "sh" of "fish". Then, the play upon the written word is characteristic. A professor at the University of Saskatchewan receives frequent communications from an unknown correspondent in Winnipeg who is pre-occupied with the Scriptures, quoting them prolifically. These communications often start—"2 wit—the oracles of God. "2 wit" is repeated time and time again throughout the several pages, written always with the numeral "2" instead of "to". Often from "oracles" he extracts the "or"; then prefaces it with one or other of the other letters of "oracles" to coin the phrase—"The core and the sore". Around this he weaves Biblical texts.

Evidently concerned about the supposed bondage inflicted by the Church of Rome, he extracts "cords" (with the implication of binding) from "oracles of God". In the Biblical text "No man shall stand before Thee", he sees the prophesy of liberation. "No man" becomes "Roman" and "free" is extracted from "before". And by similar elementary associations he gets "from Rome" from "So Little For the Mind".

The primitive or elementary mind deals in these simple direct images before it develops abstract ideas. In the process of association the recall of the original perception as an image may be more or less literal. Eidetic imagery, so thoroughly discussed by Jaensch (19), where the image recalled is seen literally, super-imposed upon the current environment, belongs to the elementary stage in the development of our more common abstract imagery. This eidetic imagery,

which, appropriately for their immaturity is common in young children, is of the order of the hallucination.

The schizophrenic patient characteristically deals profusely in symbolic associations by similarity. And not the schizophrenic alone. Primitive peoples use them lavishly. And we all use them lavishly when we are asleep and dreaming. Schizophrenic imagery is often of this literal, more elementary order. How narrow a margin separates our "normal" dreams from the patient's hallucinations!

If, as it seems, the drug induced hallucinations (20, 21, 22, 23) are comparable to those of the schizophrenic, this sort of vivid imagery evidently has a fascination so gripping that it gives a feeling of achieving the ultimate. In this stage, "you have to rely", Aldous Huxley says in his "Doors of Perception" (24), "on your immediate perception of the ultimate order". Is it ultimate order—or is it original, elementary, primitive order—so appealing because of its simplicity and its vividness?

The schizophrenic patient is remarkable, too, for his ready use of association by contrast in his images and ideas. A patient, a young man named Malcolm, was suffering from olfactory hallucinations of a foul body odour. He was upset by a conversation he overheard between another patient and nurse. The patient greeted the nurse with a familiar "Hi, Shortie". "I'm not so short" she retorted. "You are, compared with Malcolm", the patient replied. Malcolm was upset because he associated "short" with "high". He thought they were insinuating that he was smelling pretty "high".

Now we have passed from the law of similarity to the law of contrast. Contrast as a means of association has little capacity to develop beyond the elementary; and it is significant that the schizophrenic tends to use it a great deal. In any case, why do we associate by contrast? On the face of it, it makes much less sense than association by similarity. It seems natural to think of a second thing because it is like the first. But why think of the opposite?

We see things always in relation to their background. In that sense, we see things only in *contrast* to their background. We see light in contrast to darkness; we see red only in contrast to not red; we recognize sound only in contrast to silence. Even the primitive octopus, in the fascinating conditioning experiments of J. Z. Young (25), learns by contrasting the figure with the ground. Students with their introductory text in psychology are fascinated by some of the peculiarities of the figure-ground phenomena, as shown in one or other of the reversible figures—designs which, with attention sustained upon them, show at one moment one part standing out as the figure against its background, and then automatically at the next moment that part which had been the background emerges as the figure instead. Perception and hence association depends a great deal on background. We are quite at a loss to find a black cat in a dark room, or for that matter a white cat in the snow. Background gives a certain stability to perception. We depend on it for our sense of perspective. (26)

"During the dry summers of California", Hilgard observes (26) "The grass in the valleys and on the hillsides turns to a uniform brown. The rounded contours of the hills make it difficult to detect where the level plain begins to rise and become a hillside. A hillside, moreover, looks much closer than a level plain at the same distance. Here, then, we have a situation in which the estimate of distance is incorrect. What now happens to the size of the cows grazing on the hillside? Even though we are thoroughly familiar with the cow sizes, the cows on the hillside look smaller than cow size. The perception of distance, even though faulty, has won over the perception of familiar size, even though correct".

Association by contrast is something which we learn. It depends much more than associations by similarity do on experience, and it can lay a little claim to logic. Yet it is still elementary and primitive. What is of clinical interest to psychiatrists is that it seems to have a peculiar significance in schizophrenia. There is reason to believe that some of the preceptual anomalies in schizophrenia are due to the loss of stability in the contrast phenomenon—the figure-ground relationship—or as Cameron describes it (27), in the exclusion-inclusion equilibrium.

Turning now to the law of contiguity, it is here that associations are open to unlimited elaboration. Association by contiguity can range all the way from a simple, elementary connection, like eyes and eyebrows, to the utmost elaboration invested by instinct or emotion, or extended through the knowledge of cause and effect. It is here that long lines of associations take the form of logic. The associations can depend on simple sense perception or upon elaborate meaning. The fact that, in embryological development, the organs of elimination were so closely approximated, anatomically, to the genital organs as to have a common orifice in the cloaca, has left its impress on our psychosexual development, and we have never emancipated ourselves from the tenacious association between sex and sewage.

Early in the infant's experience, objects start to take on meaning for him, first in terms of his basic instinctual needs, and later in terms of the more complex needs which are more appropriately called "emotional". The baby's bottle soon comes to *mean* gratification for his oral needs. Experiences about the bottle start to count. The sight of the bottle calls up not only previous perceptual impressions of the bottle but also memories of past gratification. To the primitive, or the very immature mind, objects that gratify—then, a little later in development, objects that frustrate—become invested with portentous significance. They come to stand for something—readily become symbols—condensations of a great deal of personal meaning derived from experience. And, at first, that experience is largely instinctual. The main traffic of the primitive, undeveloped mind is in images, images derived from sense perception; it is not much in abstract ideas derived from experience. Associations at this stage are predominantly in symbols, in images. It is little wonder, then, when the schizophrenic is trafficking so intemperately in this literal imagery, that some of it would break vividly into consciousness as hallucinations.

And here it seems that we have to take into account the fact that symbolic associations may be derived not only from individual experience but also from the universal experience of the human race. An association may be unconscious not only because the individual experience has been forgotten, or never consciously appreciated, but also because the individual has not necessarily had the experience himself. It may be an inherited association based on the common experience of the race. The phylogenetic hereditary transmission of symbolic patterns, which is given so much attention by Jung (28, 29) in his concept of the Collective Unconscious and the Archetypes, was equally well recognized by Freud. (30)

As soon as the individual starts to reason out the *cause* of things—(and here is the law of contiguity by cause and effect)—then the question of power comes in. One thing seems to *cause* another. Power is venerated; so things that seem to have the power to cause are venerated. And when reasoning is limited by a dearth of adequate associations, magic is rife. Magical associations are strong. They belong to the elementary, primitive stage of life. We see the schizophrenic losing or discarding the elaborate associations acquired by long experience, and falling back upon the symbols and magical investments of this primitive stage.

A business girl in an acute schizophrenic breakdown set out on a plate, two circular biscuits, side by side. In the centre of each she put a red cherry. This was to be a gift to her boss. In order to send the gift to him, she put it on an under shelf in the hospital dining-room. This, she explained, was because her boss was the "under-manager". Here was an association by similarity of sound, and perhaps of elementary meaning, to the word "under". Here was symbolism expressing instinctual urges; here was magical thinking—expecting the gift to get to the "under-manager" because it was put on the under shelf.

Associations by cause and effect are capable of vast elaboration, and they can gather great strength. It was this that Hume brought into prominence. "Where there's smoke, there's fire". The fact that fire causes smoke is of more associative influence than the fact that fire and smoke usually occur together. The causal sequence of events is evidently the basic feature in logical thinking. But at the elementary end of the scale, "logical" thinking is *magical* thinking.

So far we have been dealing with little but the elementary forms of association by contiguity. As the individual grows, these associations start to take on emotional investment from his expanding experience. There is no limit to the complexity of the chains of associations that may be formed and there is a great difference in the strengths of particular associations. The medical student who gives the examiner the location of the nucleus of the twelfth cranial nerve does so by a chain of associations—nerve . . . cranial nerve . . . twelfth cranial nerve . . . nucleus . . . and then some picture of the floor of the third ventricle. Is he emotionally involved? Except for some motivation to pass his examination he probably could not care less where it was located. But when it comes to recalling Betty's phone number or day-dreaming up a line of memories about Betty, there is liable to be a welter of emotional investment. But in any case his associations are based essentially on contiguity.

Conclusion

In summarizing our developmental account of the associative processes, we see three main branches of development through similarity, through contrast and through contiguity. Each of the three lines has a range of complexity starting with the simple, the elementary, the primitive. Associations by similarity based simply on sense perception are the most elementary. But it must be remembered that some associations by similarity of *meaning*—mostly symbolic, archaic meaning by inheritance—are among the most primitive. Associations by contrast do not seem to lend themselves to much elaboration but evidently have a peculiar tenacity and may belong to the most primitive stages of life. The associations by contiguity are open to unlimited elaboration and the highest complexity.

If we have in mind this sort of phylogenetic sequence of development for the different associative processes, we can see more understandable order in what happens to the schizophrenic patient. He loses, so I contend, the more recently acquired facilities of association—the higher elaborations—and is left not with chaos but simply with the more elementary, primitive associative processes. His associations are not without order; the laws of association still apply, but these laws are in their more elementary forms.

Meaningful associations formed under the law of contiguity through long experience are abandoned and, instead, literal ones predominate. Reasoning by learned causal associations gives way to magical thinking. Imagery based on simple sense perception predominates over abstract ideas. The symbolic meaning of the imagery reverts to the instinctual. With some grasp of archaic imagery, Sechehaye (31) has shown how therapeutically effective these primitive symbols can be in the psychotherapy of a schizophrenic. Sometimes it seems that objects

lose almost all the meaning they acquired by experience. You watch the grossly schizophrenic child with his toys; watch the monotonous, repetitive, aimless manipulations; the toys are devoid of their acquired meaning.

Yet thought goes on. Impressions of the present and of the past are linked by simple similarity in sound or configuration, or by elementary contrast. Clang associations replace ideational associations. Words are associated not by what they stand for so much as by their sound or written form.

And words, at all times, form the matrix of communication and the matrix of thought. For people of similar experience words, by and large, convey roughly the same meaning from one person to another. But in schizophrenia it is different. Words lose their acquired meaning. They still remain the matrix of the schizophrenic's thought. But they are associated in different ways—back to the elementary, primitive, archaic ways—which to the cultivated mind seem so singularly different.

"The question is", said Alice, "whether you can make words mean so many different things". "The question is", said Humpty Dumpty, "which is to master, that's all".

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Résumé

Les associations d'idées se développent selon trois processus principaux: association par similarité, par contraste et par contiguité. Chacun de ces processus présente une échelle de complexité commençant par le plus simple, le plus élémentaire, le plus primitif. Les associations par similarité reposant uniquement sur la perception sensorielle sont les plus élémentaires. Il faut aussi se rappeler cependant que quelques associations par similarité de signification—signification principalement symbolique, archaïque, héréditaire—sont parmi les plus primitives. Les associations par contraste ne semblent pas se prêter à élaboration, mais possèdent de toute évidence une tenacité particulière et peuvent appartenir aux époques les plus primitives de la vie. Les associations par contiguité peuvent devenir l'objet d'une élaboration illimitée et d'une complexité extrême.

Si nous adhérons à cette théorie phylogénétique du développement des associations d'idées, nous pouvons comprendre davantage ce qui se passe chez le schizophrène. Il perd, selon moi, les formations associatives les plus récemment acquises, les élaborations les plus élevées, et demeure non avec un état chaotique de ses associations, mais avec l'utilisation des processus associatifs les plus primitifs et les plus simples. Ses associations ne sont pas sans ordre; les lois de l'association s'appliquent encore, mais sous leur forme la plus élémentaire.

Des associations très riches élaborées pendant de longues années selon la loi de la contiguité sont abandonnées et remplacées par des associations purement littérales. Le raisonnement à base d'associations causales apprises, abandonne la voie à la pensée magique. L'imagerie à point de départ de simples perceptions sensorielles l'emporte sur la pensée abstraite. La signification symbolique de cette imagerie s'apparente à l'instinct. Utilisant cette pensée archaïque, Séchehaye a démontré combien efficaces les symboles primitifs pouvaient être dans la psychothérapie d'un schizophrène. Parfois les objets paraissent avoir perdu toute la signification accumulée par l'expérience. L'observation d'un enfant schizophrène avec ses jouets, nous permettra de noter ses manipulations monotones, répétitives et sans but, les jouets ayant perdu leur vraie signification.

Cependant la pensée persiste. Les impressions du présent sont reliées à celles du passé par simple similarité de son ou de configuration, ou par contraste élémentaire. Les associations par le son remplacent les associations idéationnelles. Les mots sont réunis non pas tellement d'après leur sens que par leur consonnance et leur forme écrite.

Par ailleurs les mots constituent toujours la matrice sous laquelle reposent les communications et les processus de pensée. Pour les gens ayant parcouru le même chemin, les mots en général possèdent la même signification. Dans la schizophrénie, c'est différent. Les mots perdent leur signification acquise. Ils demeurent quand même le substratum de la pensée du schizophrène, mais les mots sont associés d'une façon différente, élémentaire, primitive et archaïque, ce qui apparaît à l'esprit intact si singulier.

"Le problème, dit Alice, est de savoir s'il est possible de donner aux mots tant de significations différentes." "Le problème est de savoir, dit Humpty Dumpty, quel mot est celui qui importe."

PSYCHIATRIC ASPECTS OF DISASTER—A CASE HISTORY*

Some Experiences During the Springhill, N.S. Mining Disaster

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On November 1st, 1956, a severe explosion took place in the No. 4 coal mine at Springhill, N.S.—an event that was to draw the attention of millions of people all over the world to this small town in Nova Scotia for the following 5 days.

The town of Springhill, which is 130 miles from Halifax, has a population of approximately 7,500 people. Most of the people are of English and Welsh extraction, and the family names have prevailed in this town since the first mines were opened in the area. This is in sharp contrast to most coal mining areas in Canada, where a large percentage of the population is of mixed—mainly continental European—origin.

As many mining towns, Springhill had its share of fatal accidents almost yearly, but the blast that rocked the town on this cold winter evening threatened to become one of the worst disasters in mining history.

In the following paragraph we shall quote freely from notes of Mr. R. P. Nicholson—Chief Inspector of Mines of the Dominion Coal Company—to describe the actual nature and chronology of the disaster. (Some of the details, especially the relationship between the happenings in the mine and our part in this disaster will be mentioned later).

At the time of the disaster there were 133 men employed underground. On the evening of November 1st, about 5.20 p.m. a very severe blast occurred, which killed the bulk of the men working on the bankhead, which is the point at the surface where the coal is dispatched into railroad cars or put through a processing plant. It was a wooden structure and immediately caught fire. It was completely demolished and its condition would remind one of war time damage.

Several workers were severely burned at the entrance to the mine and two rescue workers were lost from gas in the first attempt to reach the buried miners.

The No. 4 mine shaft—one of the deepest in the area—over 6000 feet deep—was blocked by fallen rocks which made rescue operation by this road impossible. Thus, another approach to No. 4 had to be found.

"This mine is connected 3,200 feet from the surface with another mine (No. 2), and the tunnel connecting them contained two (2) explosion doors. It was decided at this time to utilize the other mine and work from there re-establishing ventilation and utilizing the hoisting equipment of the adjoining mine. You will appreciate that these mines are very steep; in fact, in many places 45°, so it would be very difficult to carry a large group of victims any great distance. At the 3,200 ft. level, three (3) bodies were found, as rescue operations proceeded. There was no evidence of carbon monoxide poisoning but the bodies were badly damaged. This indicated that an explosion had happened near that point. The nearest working men were 1,200 feet below this, but the amount of carbon monoxide present in the mine atmosphere prevented rescue operations in that area until ventilation could be re-established. It was also found that there was a bad fire at the 3,200 ft. level which could cause a second explosion if it were not sealed off immediately. The work of doing this was carried on around the clock and the CO content was high enough to cause many of the bare-faced workers to become sick and, consequently, to be removed by stretcher from the mine. On November 3rd, the general opinion was that although there was a faint probability that some men in the mine would

*Presented at the Annual Meeting, Canadian Psychiatric Association, June 1957.

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be still alive, it was a fair assumption that everybody underground would have perished due to the CO content in the ventilating current. That evening three (3) men made their way out and were found by a rescue group which, of course, indicated that there may have been others alive. Rescue work was accelerated to the highest possible pitch and, on November 4th, fifty-five (55) men were found alive at the 4,400 ft. level and another group at the 5,400 ft. level. These were removed with great difficulty. The remainder of the men were found to be dead and it was decided that it would be too dangerous, in view of a bad fire in one area of the mine, to keep a large body required for rescue work in the Mine for one minute longer than was absolutely necessary to remove the living".

Early November 5th, it was therefore, decided to seal the mine off.

The Civil Defence Organization was very quickly mobilized and headed by an Army Major. Detachments of different organizations arrived very quickly not only from the neighboring towns and cities, but also the other Maritime Provinces. The local hospital was prepared for the reception of injured and burned miners. The local Armouries—also the headquarters for the Civil Defence Organization—contained approximately 100 beds and was arranged as clearing station for rescued miners. The Legion Hall—manned during the disaster period by the St. John's Ambulance, was to be an auxiliary operating theater and surgical ward, but later was taken over by the succeeding psychiatric teams under the name "Distress Center". How our psychiatric teams came into the picture was as follows.

The news about the mining disaster had taken precedence over all other information which came over the local radio stations, in spite of the world-shaking Hungarian uprising. The fate of those buried miners was on the minds of most Nova Scotians. By Friday evening—November 2nd—30 hours after the original explosion, none of the men underground had been contacted, and hope of reaching them alive had become slimmer by the minute.

The anticipation of psychological repercussions of this disaster upon the population of Springhill induced the executive secretary of the local mental health association to contact one of us for advice as to the possibility of going to the disaster area for an appraisal of the situation and the establishment of a "psychiatric first aid station". The outcome of this consultation was a phone conversation with one of the local physicians in Springhill, who enthusiastically invited us. The first "psychiatric team" that arrived on Saturday at 3 a.m. at the hospital of that community consisted of one of the authors, a social worker, and a nurse.

The town was in darkness—all street corners were manned by cadets who directed the traffic. Our first impression of the emotional atmosphere was that of tense gloom, but also of disciplined restraint. At the hospital, one of the nurses—whose fiancé was amongst the buried miners—indicated to us by words and behavior that our original assumption that psychiatric assistance was required in this distressed community was correct. Her spontaneous grateful acknowledgement of our arrival and her vague intuition that a psychiatrist's help would be most appreciated and needed caused us to enquire about the total situation, the C.D. setup and the people we could most usefully contact. After a few phone calls were made we were directed to the C.D. headquarters—where we made ourselves available. The interest in our potential usefulness eventually led to a meeting of representatives of local and visiting organizations (local physicians, R.C.M.P., Red Cross, St. John's Ambulance, Ministerial Association, etc.). The

outcome of this meeting was the establishment of the "Distress Center" and a telephone answering service in the Legion Hall.

At this point, the situation at the mine had become quite hopeless, and we expected emotional reactions such as acute grief responses, fatigue symptoms and acute anxiety reactions to appear in increasing number, not only amongst the local population, but also amongst the rescue and welfare people who had spent by now 2 days in anxious anticipation without sleep (42 hours after the explosion).

Just as we left a meeting with the local ministers, who invited us to speak to them, the air of hopelessness and gloom suddenly changed into an atmosphere of exhilaration and optimism. Three buried miners had found their way out of their tomb, and their most welcome news that most men underground were still alive, produced an excited acceleration of the rescue operation.

These 3 rescued men and several others who followed shortly after, not only told a story of remarkable heroism, leadership and morale amongst these miners who knew that their chances to leave the mine alive were very slim, but also brought the news of the death of several comrades. This information, the delay of the rescue of dozens of others and the knowledge of the presence of a high CO and CH₄ concentration in the atmosphere within the mine, and the possibility of renewed explosions very quickly dampened the prevailing spirit of optimism. The increasing obstacles in the rescue attempt of the remaining buried miners very quickly enhanced the uncertainty and the fatigue in the total population.

The first acute grief reaction came to our attention at this time. This case was shortly followed by a call to a teen-aged daughter of one of the rescued miners who "went into hysterics" at the sight of her father, who was discharged by the screening team to home care. The visit at this home gave one of us (R.J.W.) an opportunity to interview one of the first survivors. The latter exhibited a considerable pressure to relate his experiences of the last three days underground, in spite of the insistence of his relatives and friends "to take it easy and rest" rather than to talk.

While one of the authors visited these 2 patients at their home, fatigued and anxious people began to reach the "Distress Center". Some required reassurance, mild sedation or tranquilization, but the majority of these people seemed to utilize this "Center" rather for symbolic reasons—i.e. 2 elderly men came to the office—evidently slightly inebriated, and both wept quietly after mutual reassurance. During this period of anxious, uncertain anticipation, it became particularly evident that eating and drinking—and sandwiches and coffee were available everywhere—acquired in increasing manner a tension reducing function. People sat like swarms of bees around radios with a cup of coffee in one hand and one or more sandwiches in the other.

After continuous duty for 15 hours, the first psychiatrist was relieved by another staff member of the Department of Psychiatry of the Dalhousie Medical School. In the next 24 hours—during which considerable delay in the rescue operation occurred—the organization of the "Distress Center" was consolidated and the detachment of the St. John's Ambulance occupying the Legion Hall reoriented towards the Psychiatric aspects of "First Aid". The treatment of a few "psychiatric cases" in the presence and with the help of this group of workers renewed its morale after 2 days of inactivity and feeling of uselessness. Registration of all people who received psychiatric help was also initiated.

Shortly after, a third psychiatrist accompanied by a psychiatric resident arrived on the scene on Sunday evening, and the number of psychiatric casualties that came to our attention started to increase. By then, 72 hours had elapsed

after the initial blast. The entire population, as well as the staff of the different rescue groups were beginning to show the strain of sleepless nights and anxious anticipation.

In addition, a considerable delay occurred in "lifting" the remaining survivors still in the depths of the mine. News releases from the mine head had also been reduced since Saturday evening. This latter policy was in contrast with the flood of reports of the previous 2 days. It was difficult to elicit whether anyone was in contact with the buried men or/and in what condition the latter were. It was generally realized that every hour's delay exposed the survivors in the mine to the noxious gases which were known to be present underground in very dangerous concentrations.

The existence of the "Distress Center" was now well known and accepted, and its services sought without reservations.

The presence of the St. John's Ambulance Brigade at the "Center" was most welcome. These volunteers adapted themselves with amazing flexibility to the task of taking care of psychiatric casualties, a task which was not very familiar to them.

A psychiatrically trained nurse volunteered her services to the "Centre", shortly after its establishment, recognising her potential usefulness to the "psychiatric team".

Many "cases" during these "rush hours" were taken care of by non-medical personnel—either at the "Center" or in the homes of those people who called on us for all kinds of services. All therapeutic activities of these workers were subject to psychiatric consultation before or/and after the call.

In mentioning the "rush hours" at the "Center", I am referring to the period from Sunday midnight to Monday noon, when the majority of the surviving miners reached the surface. After the rescue of the last survivor, it was decided to seal the mine before the dead workers were removed.

Our last team—the fourth—left Springhill on Tuesday at noon, together with the rest of the visiting volunteer organizations.

In the following paragraphs, I will attempt to cover briefly and generally the therapeutic activities of our psychiatric teams.

It was our impression that those people who used our services considered us first and foremost to be physicians. The medical emblems on our cars in front of the "Center" proved to the community that Doctors served in the Legion Hall. Many calls dealt with purely physical conditions—one fracture, gall bladder attack, etc. These calls were directed to the "Center" especially when the local Doctors or other visiting physicians could not be contacted. Of course we made ourselves available for these services.

The psychiatric cases came mainly from the general population of the town. Fatigue, anxiety, grief reactions and to a much lesser degree "hysterics" were the symptoms that brought patients to our attention.

We saw actually very few rescued miners, and only two received more intensive psychiatric assessment. Both displayed the symptoms of an acute organic brain syndrome—characterized by excitement, confusion, irrational thinking and spotty memory.

In total, about 46 patients were seen by our psychiatric teams—from early a.m. Saturday till Tuesday noon.

Several staff members of the local and visiting volunteer organizations came for sedatives, but none required more than superficial reassurance and the indicated drugs.

We mentioned before that our "Distress Center" had more than a thera-

peutic function. In the stressful atmosphere the focus of attention of the total population was directed to the mine—the center of the disaster—and the buildings in which medical services were given or were potentially available. Many people and staff members of the volunteer organizations witnessed “psychiatrists in operation”, and some of our activities in the “Center” and homes, as well as our therapeutic attitude appeared to have been reassuring as well as educational. As a sociological aside, we would like to mention the fact that we as psychiatrists found ourselves well accepted by the population as well as by the clergy, our medical colleagues and the volunteer workers.

The psychiatric treatment of our patients consisted necessarily of emergency procedures. At the “Distress Center” we had a few beds available and some patients spent a few hours at the Legion Hall under our supervision—mostly asleep.

Before dispensing any drugs, we attempted to interview our patients—especially those patients who were seen in acute grief. The experience with one grieving lady who received moderately heavy sedation from a layman because of “hysterics”, taught us that grieving people should have first of all an opportunity to express their sorrows and their feelings of loss, etc., before sedation is applied. A personal interview can be very effective and possibly also prophylactic! It often centers around the new reality situation, following a period of silence.

Anxiety states responded well to Meprobamate and fatigue reactions to moderately heavy sedation again after short interviews. Only one patient required intravenous pentothal for complete relaxation and rest.

The two organic reaction cases received intravenous Sparine (100mgm.). One of these improved sufficiently to be discharged again, but the other patient had to be admitted to a psychiatric unit. The eventual psychiatric condition of the rescued miners will require consideration in another paper.

Following the closing of the No. 4 mine in Springhill, the town began slowly to readjust to the inevitable pressures of reality.

This mining disaster and the amazing rescue operation at the No. 4 mine has made a distinct mark on this town in Nova Scotia, and will remain in the memory of its people for many years to come.

Discussion

The participation of several members of the Dept. of Psychiatry—Dalhousie University, Halifax—as part of the Civil Defence Organization during the mining disaster of Springhill, was more due to an instinctive impulse than to planned action. Nevertheless, whatever we were able to contribute to the comfort of the people in Springhill during those days of stress, we have benefited considerably by our experiences. As “participant observers” in a distressed community, each of us—and each individual remained only 24 hours in the area—learned a great deal. The comments which are to follow are the outcome of several discussions and a summary of our collective opinion (5 psychiatrists, one psychiatric resident and one social worker).

In table I we attempted to demonstrate the relationship between the events in the mine, the emotional responses of the population in the observer community and the activities of the four (4) psychiatric teams. We also tried to indicate how the three phases of the natural history of disaster as described by J. Tyhurst¹ may be applied to our “case history”.

The main focus of our attention was the psychiatric casualties amongst the citizens of Springhill and only very few rescued miners were seen, or

¹“Behaviour under stress”—Defence Research Board—Canada—Symposium 1950. Paper No. 19, Ottawa 1950.

TABLE I

Phase	Events in Mine	Hours	Time	Emotional Response of Civil Population	Tyhursts Classification	Psychiatric Activities	
I	Explosion Immediate Deaths	0	1.11.56	Anxiety Panic Grief	IMPACT RECOIL		
II	1st Rescue attempts NO NEWS	5	1.11.56 10 p.m.	Fearful anticipation			
III	HOPE ABANDONED	24 38	2.11.56 3.11.56	Grief Hopelessness		Arrival 1st team AJC RJW	
IV	1st Rescue	43	3.11.56	Joy Over-optimism Euphoria Fatigue		Organization "DISTRESS CENTER" 2nd Psych. team JFN AJC	a few patients seen a few patients seen
V	DELAY (Mixed reports)	72	4.11.56	Apprehension Losing hope Fatigue		3rd Psych. team FAD HC	Increasing referral rate RUSH HOURS
		80	4.11.56	Fatigue Grief			
VI	FINAL RESCUE	83	5.11.56	Joy Fatigue Grief			
VII	SEALING OFF AND DEAD ANNOUNCED	90		Grief Fatigue Relief Beginning Acceptance & Readjust-		4th Psych. team HKM CSM	Immediate & MARKED DROP in civilian referrals (a few miners seen)
VIII	Termination of rescue operation	115	6.11.56	Acceptance & Readjustment	Post traumatic period	Withdrawal	

treated during this period by our psychiatric teams. However, since November 1956 a relatively large number of the latter came to our attention, indicating to us now that we left the disaster area possibly too soon. Although the more severe psychological symptomatology in the rescued men became more obvious after an interval of several weeks following the disaster, a systematic psychiatric examination of all miners who spent several days trapped underground would have been helpful diagnostically as well as therapeutically.

The main psychiatric pictures seen and treated within the community were those of anxiety, panic, tension, grief-reactions, depression, excitement and various degrees of fatigue.

Pressure to talk, eating, drinking and a tendency to form smaller groups were some of the psychological and social self-correcting mechanisms that counteracted individual and communal disintegration.

The cohesion of this particular mining community and its occasional "reimmunization" against fatal mining accidents, explained the excellent morale and the relatively few signs of individual and social disorganization.

The tense atmosphere within the town affected not only the inhabitants of the community, but also the entire CD staff—including the psychiatric teams. The latter, however, were less exposed to this stress, due to the 24 hourly rotation of duty—a procedure which should be considered wherever civil defence workers are called upon to render service in a stress area.

The lack of planning for psychological first aid, our own inadequate experience in this field, the unfamiliarity of our working conditions and the near normal symptomatology encountered were all a challenge to us. Not only did we have to develop our own roles in this stress situation, but we also had to organise a "Center" where we could function as psychiatric teams, which were reinforced by civil defence workers who were trained by us. This latter on the job training had two functions—it prepared staff members of the Civil Defence Organization for psychological first aid, and it also occupied them during the quiet periods between rush hours. The collaboration of the general practitioners of medicine, the clergy, the local and visiting volunteer organizations with us was not only helpful and at times indispensable in our task as psychiatrists, but also very educational to all concerned.

On the basis of our limited experiences as psychiatrists who functioned within the framework of a civil defence organization during a disaster we would like to make the following suggestions.

1. Greater participation of psychiatrists in the CD planning for disasters.
2. More frequent participation of psychiatrists during actual rescue operations at disasters.
3. Financial grants for psychiatric research of disaster to be made available in all Provinces.
4. Wide distribution of a "Psychological First Aid Manual".
5. More intensive training in "Psychological First Aid" of all CD workers.

Résumé

L'histoire vécue du désastre de la mine Springhill raconte l'établissement et l'organisation d'un centre de secours et la participation dans ce désastre de l'équipe psychiatrique.

Les auteurs décrivent les différents syndrômes psychiatriques rencontrés et leur traitement d'urgence.

L'expérience obtenue lors de ce désastre dicte quelques suggestions pour ce qui a trait à la participation psychiatrique dans les plans de défense civile.

Editorial

Royal Commission (U.K.) on Mental Illness

The Royal Commission which reported to the Parliament of the United Kingdom in May 1957 consisted of eleven members, among them notable representatives of the legal and medical professions whose names are familiar to Canadian readers.

The report is lengthy (302 pages), and complicated due to the complexity of the material and the style of the main body of the report which is in the form of a somewhat repetitive discussion. The content which consists of historical reviews and historical references, of reviews of current statutes and practises, of nosological discussions, of opinions and recommendations, is at times confusing but loaded with information and ideas of great potential value to anyone concerned with the development of comprehensive services for the mentally disordered.

The reader who wants a relatively brief statement of the contents is referred to the "Summary of Main Conclusions and Recommendations" (page 3-20) which is clear and concise. However in doing so he may miss the significance of some of the comments and also the picture of changing concepts and practises which is portrayed in the full report.

Canadian readers may find that familiar terms have a different meaning in British usage, e.g. "certification" involves judicial commitment; "mental defect" was used by the 1908 Commission to include the whole range of mental ill-health and "mental defectiveness" is still used to describe "any form of incomplete or arrested development of mind which arises before the age of eighteen",—with the rather startling addition "whether or not the patient is of subnormal intelligence." This use of the term "mental defect" makes it possible to include under it the "moral defective" or what we might call psychopathic personality. This usage did not originate with the commission but the commission evidently accepts it and suggests a corollary namely the broadening of the term "psychopathic personality" to include the higher grades of the feeble minded. The discussion of Terminology in Part III is interesting and thought provoking. Whether it clarifies anything is perhaps beside the point in view of an earlier statement that "there is no clear cut medical distinction between the two (mental illness and mental deficiency): they are legal and administrative rather than clinical terms."

The sections dealing with "Procedures Applied to Individual Patients" which form the greater part of the report are too closely related to historical developments and the several Acts currently in force to be dealt with briefly. Mention is made of the complexity of the various statutory procedures now in use and this is well illustrated by many references to the various Acts. The situation with respect to legislation is much more complicated than in this country and we would no doubt all agree that simplification and reform are overdue. However many of the recommendations and comments appear to be directed as much against popular attitudes and administrative policy, as against statutory requirements although reference is made to evidence that popular opinion favours a more liberal treatment of patients than the present law permits. The recommendations which are numerous, detailed and designed for application to a variety of patients and situations are nevertheless based on a few principles which are stated repeatedly and in a variety of ways. In brief the principles are follows:

- 1) The majority of mentally disordered patients do not need to be admitted to hospital as in-patients.
- 2) Those who do require admission should be able to enter hospital without compulsion and without being subject to detention.
- 3) If no compulsion is to be used, admission should be without formality.
- 4) Provision for emergency admissions with a minimum of formality is required.
- 5) Every effort should be made to persuade patients and their relatives to agree to the provision of care without compulsion.
- 6) "The law should allow mentally ill patients to be admitted compulsorily to hospital or to be placed under guardianship in the community when the use of compulsion is necessary for the patients' own welfare or for the protection of others." (The circumstances in which it may be necessary to override the objections of patients or their relatives are carefully spelled out.)
- 7) Protection against unjustifiable admission and detention is to be provided by:

More attention to the medical indications for admission, provision for expiry and renewal of compulsory powers (72 hours, 28 days, one year, etc. depending on the nature of the case), provision for periodic review and access of patients to reviewing authorities, and by the extension of powers of discharge to the hospital authorities.

The recommendation on the admission of patients on two medical certificates without a judicial order is similar to current practice in Canada. There is one interesting recommendation however that is different, "Under the normal procedure as distinct from the emergency procedure, at least one of the two medical certificates should be given by a doctor specially experienced in the diagnosis or treatment of mental disorders, and the other if possible by the patients' general practitioner or another doctor who already knows the patient". The suggestion is made that a doctor on the staff of the receiving hospital might make out one of the certificates. Elsewhere it is suggested that the normal procedure should be for a member of the hospital staff to see the patient in the O.P.D. prior to admission.

Section 416 is a statement of what the medical statement should contain and reads in part "... The main aim of the written medical recommendation should be to make the reasons for the recommendation clear to the other people who take part in the procedures, including those who will later have the powers to discharge the patient. In most cases the main part of the recommendation should consist of a fairly full explanation why hospital care is recommended rather than community care, or vice versa [this refers to recommendation for guardianship in the community], why it is not considered possible to provide suitable care without the use of compulsory powers and why the provision of care under compulsory powers is necessary for the patients' own welfare or for the protection of others ..."

Throughout the report reference is made to the care of patients in the community. There are excellent statements on social care and treatment, on after care of hospital patients, descriptions of the first level of help, comments on day care training for mentally defective children, on provision for advisory service to parents, and on the care of the aged.

Part V on "The Local Administration of the Mental Health Services" is of particular interest to those concerned with a broad program of patient care. Most of the comments and recommendations made here are based on the condition that the mental health services are integrated into a comprehensive system of

health and welfare. Some of them could be carried out only in a so called "welfare state". However this is a section that is well worth reading. Of a number of recommendations only four will be mentioned because of their pertinence to current developments in this country.

1) Contacts between psychiatric and other interests within the hospital service and within the local authority services should be developed and strengthened.

2) Hospitals should provide in-patient and out-patient services for those who need specialist medical treatment or training or continual nursing attention; local authorities should be responsible for preventive services and for health or welfare services for people who do not require hospital in-patient treatment or training or who have been in-patients and are ready to return to the community.

3) "We consider it essential that the central direction of the community services for mentally disordered patients should be in the hands of the medical officer of health."

4) (With reference to the mentally defective) "... there should be new administrative arrangements which would bring together the resources of the local authority mental health service, the hospital service, the education and school health services (for children), and (for adults) the local authority's welfare department, for the diagnosis and periodical re-assessment of such patients and for deciding the forms of care most suitable for each individual patient."

The final section has some interesting comments on "Civil rights, liabilities and disabilities", "Marriage and Divorce" and other matters relating to patients.

RESEARCH GRANTS

The Foundations' Fund for Research in Psychiatry announces the availability of a limited number of block grants (fluid funds) for research in departments of psychiatry in medical schools and clinical facilities with established training programs. Applications submitted prior to March 1, 1958 will be acted upon during 1958. A few awards may be made later to programs submitting requests by March 1, 1959. For further information, interested departments are invited to write to the:

Executive Officer
Foundations' Fund for Research in Psychiatry
251 Edwards Street
New Haven 11, Connecticut, U.S.A.

Book Reviews

Psychotherapy of the Adolescent

B. H. Balser (Editor), International Universities Press, Inc., N.Y., 1957. 270 pp. \$5.00.

One of the problems presented by most medical meetings, of which psychiatry represents a typical example, is that the content of papers available for presentation exceeds the time allotted to the speakers. One of the methods of overcoming this difficulty is to gather the papers together and publish a book. This is the origin of the book on *Psychotherapy of the Adolescent*, edited by B. H. Balser. It consists of the various papers and discussions of a Symposium on Psychotherapy of the Adolescent, held at the meeting of the American Psychiatric Association in Atlantic City in 1955.

To some extent the title is misleading. This book deals not only with psychotherapy but reviews the various problems and methods employed by psychiatrists in the handling of adolescent problems of a psychiatric nature. The speakers represent clinics dealing with problems of varying severity and in differing socio-economic groups. As such it provides a good over-all picture of the problems encountered and methods employed in their solution.

If one approaches this book from the point of view of obtaining insight into the techniques in psychotherapy in the adolescent, one is bound to be disappointed. If, however, one wishes to obtain a general picture of the various techniques and methods employed in the care of adolescents in both the out-patients and the in-patient level, this book will be a useful reference source.

One chief criticism of a book of this nature is inherent in its structure. Consisting of a number of independent papers, the book tends to be fragmented and to some extent repetitive. On the whole, however, it should be a useful reference book for psychiatrists with interest in this specific area.

G. E. H.

Practical Clinical Psychiatry for Industrial Physicians

W. Donald Ross, M.D., B.Sc.(Med), F.R.C.P.(C); Charles C. Thomas, Springfield, Ill., 1956. 401 pp.

There are few psychiatrists who have the opportunity to work intimately in an industrial setting. One of the exceptions to this statement is the author of this book, an ex-Canadian, who holds an academic appointment in both the Department of Psychiatry and the Department of Industrial Medicine at the University of Cincinnati.

The field of industrial psychiatry represents a relatively new interest of psychiatrists, and up to the present time has consisted primarily of isolated reports in the literature.

This book fills this long-felt need by providing a concentrated source of reference. Dr. Ross covers very adequately the contributions which psychiatry might make in an industrial medical setup without fanfare or ballyhoo. He considers the psychological aspects of the industrial organization as well as a more technical consideration of the psychiatric aspects of such outstanding industrial problems as absenteeism, worker turnover, alcoholism and accidents.

If there is any criticism of the book it is the fact that the source material

drawn upon almost entirely neglects many very excellent studies of psychiatric problems in industry which have been carried out in Great Britain.

Despite this one limitation, it still remains an extremely useful reference book for physicians in industrial medicine.

G. E. H.

PERCEPTUAL PROCESSES AND MENTAL ILLNESSES

By H. J. EYSENCK, PH.D., G. W. GRANGER, PH.D., J. C. BRENGELMANN, M.D., PH.D., MAUDSLEY Monograph No. 2; London. Published for the Institute of Psychiatry by Chapman and Haw. 144 p.

In this study an attempt has been made to relate perceptual functions, both simple and complex, to neurotic illnesses by comparing the performance, on a variety of tests, of three carefully matching groups — normal, neurotic, and psychotic. The main concern is with the value of such tests in measuring personality functions likely to be important in military, industrial, and educational selection as well as the screening of potential neurotics and psychotics.

The theoretical model within which the experiments were designed is by now well known, and has been summarized by Eysenck in a series of papers and publications. With regard to the experiments themselves they range from relatively simple perceptual tests such as dark vision, visual acuity, etc., to more complex perceptual processes which include after-image and tachistoscopic experiments on perception of the third dimension. The discriminative ability of non-perceptual tests such as questionnaires, autonomic and intelligence tests are compared with the measures of perception.

The authors claim that marked differences between the groups are observed on both the simple and the more complex tests. It is interesting that certain physiological measures dealing with pulse rate and blood pressure showed no marked differentiation, whereas motor response such as body-sway suggestibility gave differentiation only slightly inferior to those of perceptual tests.

Not all will agree with the statistical treatment afforded the raw data. The samples are small, F ratios are shown, but t between Normal Neurotic and Psychotic is not given. The fact that factor scores do not differentiate as well as the scores of single tests making up the factor indicates that errors of sampling (attributable to the small number) may account for many of the differences.

In spite of the above criticism this monograph, which is well and carefully written, shows lines of research which are tantalizing. One would like to see a full scale predictive study which uses and extends the significant findings in this work.

J.E.G.

EMOTIONAL DISEASE IN THE POPULATION OF A PREPAID MEDICAL CARE PLAN*

HARDING LE RICHE, B.Sc., M.D., M.P.H.¹

At the present time it is generally accepted that emotional disturbances may be important causes of ill health. The diminution of infectious diseases in Western European, North American and certain other groups, associated with longevity, causes such conditions, whether mild or severe, to stand out by contrast. Whether these relatively "aseptic" communities are exposed to greater or lesser stress than people living in China, India or Tanganyika is a matter for discussion, but not in the present paper!

Before attempting to measure the prevalence of emotional disease, we must try to define our terms. It is easy to measure the prevalence of typhoid fever, pneumonia or tuberculosis, because these are clear-cut clinical situations, which can be isolated from other diseases by clinical, laboratory and pathological studies. They are the conditions on which generations of medical students have been trained.

But in the field of emotional disturbance, diagnoses are not so obvious. In most cases the diagnosis must be made by the physician aided only by his own senses. In general, he has doubts about his criteria of normality in mental good health. Consequently his measuring standard is considerably less adequate than when he deals with infectious disease or congestive cardiac failure.

As Desmond Curran¹ points out, medical students start their clinical studies with the common misconceptions on psychology and psychiatry shown by the ordinary man in the street, reinforced by a specially difficult twist, from the point of view of teaching psychiatry, given to them by their medical education. This may be the reason why so many medical men are more antagonistic to psychiatry than the educated layman. This author also lists certain of the common problems and misconceptions about psychiatry current amongst medical students. Most important amongst these are that a structural morbid change should accompany all disease; that psychological lesions are a sort of mental abscess, which, when lanced, produces laudable pus in the form of an emotional discharge; that mental illness is basically due to an attempt to escape from difficulty and that emotional disease is thought by psychiatrists to be due to "repression", the latter meaning discipline and self discipline; hence the erroneous idea that psychiatrists hold it best to spare the rod and spoil the child.

Bearing these difficulties in mind, an attempt has been made to obtain some picture of mental illness, in the widest sense of the term, amongst the population of a prepaid medical care plan. The material was a 2% sample of the Physicians' Services Incorporated comprehensive plan, 1954 data, comprising close to 8,000 participants, studied during one year. The diagnoses stated on the cards, and the method of classification suggested by John Smiley and collaborators¹¹ of the Department of Psychiatry and Preventive Medicine, University of Western Ontario, London, were used.

This grouping, based on detailed items from the Sixth Revision of the International Statistical Classification of Diseases, Injuries, and causes of Death, divides illnesses into six broad categories as follows:

¹School of Hygiene, University of Toronto.

*This paper is prepared from material gathered for a research project supported by the Board of Governors of Physicians' Services Incorporated, to whom my fullest appreciation is expressed, while Dr. J. D. Griffin and Dr. G. E. Hobbs kindly criticized the paper. The latter provided most useful additional material for inclusion.

1. Definite Psychosomatic, of which details are shown in Table 1 of the present paper.
2. Probably Psychosomatic. This includes migraine, peptic ulceration, functional disorders of stomach and intestine, peritoneal adhesion, pruritus, and headache.
3. Possible Psychosomatic. This is a long list, of which highlights are various, allergic conditions, benign hypertension, menstrual and menopausal disorders, arthritis, and certain genito-urinary symptoms.
4. Accidental Injuries.
5. Indefinite Psychosomatic. This includes general vague symptoms, and other ill-defined and unknown causes of morbidity and mortality.
6. Other causes of disease in the International list.

The term "psychosomatic" in the first item is no longer used by the originators of the classification. This should therefore read: "Definite Psychiatric Diagnoses".

The table given below shows the percentage of all P.S.I. expenditures in the comprehensive plan, under each diagnostic category, the number of sickness episodes, total services, and sick persons per 1,000 participants during one year.

Disease episodes, or spells of illness or sickness, were determined by a study of each patient's account cards submitted by physicians over a period of one year. It was easy to determine separate episodes of acute illness, but chronic conditions had to be decided upon in a more or less arbitrary manner. In general, illnesses separated by a period of apparent good health of one month or more, were regarded as separate episodes. It will be noticed that most of the psychiatric diagnoses in our tables were regarded as chronic conditions, as the number of "episodes" per 1,000 participants, were in most cases just about the same as the number of "persons" involved.

This material gives a composite picture of psychiatric diagnoses by Ontario physicians, specialists as well as general practitioners. Obviously, diagnostic criteria for these conditions may show great variation, as is shown in Table II. There also appear to be real variations in prevalence in different areas and types of population.

The "narrow" classification used in Table II would be those psychiatric conditions of a serious nature, which would usually be referred for specialist psychiatric treatment, while the "broad" classification would include many shades of the disease spectrum, some of which would be treated by general physicians, or not treated at all.

The commonest sickness episodes shown in Table I are Anxiety Reaction without Somatic Symptoms (code 310), followed by Nervousness and Debility (code 790), Psychoneurotic disorders, other mixed and unspecified (code 318), Psychoneurosis with somatic symptoms affecting the Digestive System (code 316), Primary Childhood behaviour disorders (code 324), followed by Psychoneurosis with Somatic Symptoms affecting the Circulatory System (code 315), Psychoneurosis with somatic symptoms affecting other systems (code 317), and Neurotic Depressive Reaction (code 314).

The major psychoses are uncommon in the P.S.I. group, which is relatively favoured, having an excess of young working adults and children, compared with the total population of Ontario.

The prevalence of "Definite Psychiatric" conditions in the P.S.I. material corresponds well with those found by Smiley et al¹¹ in the Windsor data.

From material collected from the Psychiatric Outpatients Department of

TABLE I
P.S.I. 2% SAMPLE, 1954
DISEASE EPISODES, SERVICES, SICK PERSONS & PERCENTAGE OF TOTAL COSTS
PSYCHIATRIC DIAGNOSES: DETAILED INTERNATIONAL CLASSIFICATION

	% of Total Allowed	Episodes per 1,000 Participants	Services per 1,000 Participants	Sick Persons per 1,000 Participants
DEFINITE PSYCHIATRIC DIAGNOSES				
300 Schizophrenic Disorders.....	.07	.13	2.47	.13
301 Manic-Depressive Reaction.....	.03	.65	14.83	.65
307 Alcoholic Psychosis.....	.01	.13	.78	.13
309 Unspecified Psychosis.....	.01	.26	.65	.26
310 Anxiety Reaction without somatic symptoms.....	.79	11.84	34.49	10.15
311 Hysterical Reaction without anxiety reaction.....	.04	.78	2.86	.78
314 Neurotic Depression Reaction....	.43	.78	14.83	.78
315 Psychoneurosis with somatic symptoms affecting circulatory system.....	.04	1.04	2.08	1.04
316 Psychoneurosis with somatic symptoms affecting digestive system.....	.09	2.60	5.33	2.21
317 Psychoneurosis with somatic symptoms affecting other systems..	.03	.91	2.08	.91
318 Psychoneurotic disorders, other, mixed and unspecified types.....	.35	6.89	19.13	6.37
320 Pathological personality.....	.10	.13	3.77	.13
321 Immature Personality.....	.00	.26	.26	.26
322 Alcoholism.....	.03	.13	1.69	.13
324 Primary childhood behaviour disorders.....	.02	1.43	1.56	1.43
326 Other & unspecified character behaviour & intelligence disorders..	.03	.53	1.30	.39
790 Nervousness & debility.....	.23	7.81	13.01	7.55
	2.35	36.31	120.59	33.31

the Westminster Hospital, London, Garmany³ finds a higher proportion of depressions than are shown in the P.S.I. data, as may be expected. It should be mentioned that the P.S.I. material covers services by all physicians, not only psychiatrists. According to Garmany, anxiety states are often diagnosed when other states are basic and anxiety a secondary phenomenon. This is particularly the case with depressions.

An anxiety state may be defined as an interreaction between a constitution which is some way predisposed, and operative existing stress factors.

The stress factors considered to be operative in his series of 158 cases are shown as follows:

Personality	70%	Financial	8.7%
Domestic	35%	Housing	9.4%
Work	20%	Physical	2.7%
Other Social		None	
Factors	10%	Ascertained	8.7%

The factors recorded are not mutually exclusive and in some cases two or more were present, which explains why the percentages add up to more than 100.

Personality factors were considered important in 70% of the cases in this London group and of these factors an obsessional character was by far the

TABLE II.
FREQUENCY OF PSYCHIATRIC DIAGNOSIS IN MEDICAL PRACTICE

Author	Date	Source	Definition of Estimates	Estimates
Donnan ²	1947	100 consecutive patients, estimated emotional component 1-10	All illnesses.....	45.3 %
McGregor ⁶	1950	Analysis of 1 year of general practice (2,486 patients)	Broad classification.....	28.1 %
			Narrow classification.....	5.5 %
Pemberton ⁸	1949	All patients in 1 week general practice—7 physicians	Broad classification: Winter week.....	14.5 %
			Summer week.....	16.0 %
			Narrow classification: Winter week.....	6.0 %
			Summer week.....	7.2 %
Hobbs, Buck et al (unpublished)	1951	Windor Medical Services Medical Plan (60,827 calls)	Broad classification.....	21.8 %
Harding le Riche ⁸	1954	Prepaid Medical Plan (Sample of 2% consisting of 8,000 participants).	Broad classification—% total cost.....	14 %
			Narrow diagnosis: % total cost.....	2.35 %
			Episodes per 1,000 per year.....	36.31
			Services per 1,000 per year.....	120.59
			Sick persons per 1,000 per year.....	33.31
Rennie ⁹	....	New York City (sample of 1,660 individuals)	Psychotic: Lower class.....	13 %
			Upper class.....	3.6 %
			Neurotic: Lower class.....	25 %
			Upper class.....	11 %
			Personality: Lower class.....	15 %
			Upper class.....	5 %
			Psychiatric rejects (variation by year).....	2.2-12 %
Rowntree ¹⁰	....	United States Selective Service	.....	6.1 %
Lemkau ⁶ et al	....	Baltimore (care of social agencies)	Psychotic.....	1 %
Leighton ⁴	....	Small town (interviews and questionnaires)	Psychoneurotic.....	57 %
Standish ¹² et al	1953	Practitioners (4 Tuesdays at 3 month intervals; 1/4 of physicians of State).	Mental.....	3.0 %
			Nervous system.....	2.5 %
			Symptoms and ill-defined.....	4.0 %



most common. The obsessional personality creates stresses wherever it goes, because of the high standards it demands and its difficulty in delegation. An example might be afforded by the obsessional housewife who copes very well in a flat and then develops anxiety symptoms after moving into a house; or a patient who coped very well with his six companies, but developed bad panic attacks when his father died and left him another nine. No doubt many of the cases of psychoneurosis with somatic reference to various systems are also anxiety reactions.

Primary childhood behaviour problems are present to a small degree and this poses the question of the need for wise psychiatric care, possibly for the parents as well as for these disturbed children.

From our material, there were 1,384 sickness episodes per 1,000 participants during one year for all types of illness. It is of interest to note that in the Canadian Sickness Survey 1,156 sickness episodes were reported per 1,000 persons in 1950-51.

In his excellent papers, which are based on the Sir Charles Hastings Prize Essay for 1955, Watts,¹³ an active general practitioner in the United Kingdom, has shown that two-fifths of his cases of mild endogenous depression presented as possible organic disease. Most of these cases do not reach a psychiatrist and they could in most instances be adequately dealt with by general practitioners. It should be noted that mild endogenous depression is a self-limiting disease which in 85% of cases remits after a few months or years. But this state should be recognized and such patients can be greatly helped by their family physicians.

The condition is frequently disguised, and is often misdiagnosed either as an anxiety state or as an organic illness. It can also occur as a graft on to established organic disease.

The good general practitioner knows his patient over a period of years and he alone can notice slight changes in personality which may indicate mild depressive states. By careful physical examination, combined with other necessary diagnostic aids, he can exclude organic disease. Interest in mental disease certainly does not mean a slovenly approach to clinical diagnosis. For the good physician the exactly opposite situation applies.

The present information is presented in the hope that it will serve as encouragement for further research in psychiatric disease in this country.

Summary

1. The difficulties of objective diagnoses in diseases of emotional origin are discussed.
2. The findings are given of psychiatric diagnoses by all physicians in 8,000 participants in a prepaid medical care plan, over a period of one year.
3. These findings are shown in terms of percentage of total expenditure, episodes of illness, services and number of sick persons per 1,000 per annum.
4. In order of frequency of occurrence the conditions were: Anxiety Reaction without Somatic Symptoms, Nervousness and Debility, Psychoneurotic orders, mixed and unspecified, Psychoneurosis with somatic symptoms affecting the Digestive System, Primary Childhood behaviour Disorders, followed by Psychoneurosis with Somatic Symptoms affecting the Circulatory System, Psychoneurosis with somatic symptoms affecting other systems and Neurotic Depressive Reaction.

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Résumé

- 1) Les difficultés à en arriver à un diagnostic objectif dans les maladies d'origine émotionnelle sont discutées.
- 2) On donne les résultats de la compilation des diagnostics psychiatriques, établis par tous les médecins d'un groupe de 8,000 bénéficiaires d'un plan d'assurance maladie, pour une période d'un an.
- 3) La compilation s'intéresse particulièrement à des item tels que le pourcentage des dépenses totales attribué au soin des malades, le nombre d'épisodes de maladie, le genre d'attention médicale et le nombre de personnes atteintes de maladie par 1,000 de population par année.
- 4) Par ordre de fréquence les principales entités psychiatriques furent:
Réaction anxieuse sans symptôme somatique, nervosité et débilité, trouble psychonévrotique mixte et non spécifié, psychonévrose avec maladie somatique affectant le système digestif, trouble du comportement chez l'enfant, psychonévrose avec symptômes somatiques affectant les autres systèmes et réaction neurodépressive.

MEMBERS PLEASE NOTE

The Office address of the Secretary of the Canadian Psychiatric Association, Dr. C. A. Roberts, has now been changed to:

Dr. C. A. Roberts,
Secretary,
Canadian Psychiatric Association,
P.O. Box 6034,
Montreal, P.Q.

CONSTATATIONS ELECTROENCEPHALOGRAPHIQUES DE NATURE EPILEPTIQUE DANS 2200 EXAMENS DE PATIENTS PSYCHIATRIQUES*

JEAN PANET-RAYMOND, M.D.¹

Il nous a paru intéressant de faire une étude statistique sur les 2,200 examens par électroencéphalographie que nous avons faits depuis janvier 1949. Cette étude se termine en décembre 1956 et représente parfois jusqu'à quatre examens pour le même patient.

Sur ces 2200 EEG, de toutes catégories, adressés au laboratoire pour divers syndromes, nous avons trouvé 576 cas (26%) présentant une activité épileptogénique de type électrique tandis que 1,624 cas (74%) ne présentaient aucune activité épileptique. C'est donc dire que, sur une population d'hôpital mental, nous devons admettre à l'avance qu'il se trouve environ 26% d'épilepsie prouvée électrographiquement ou à l'état latent. (Tableau no I) D'autre part, ce chiffre de 576 cas représente un pourcentage de 69.5% de confirmation d'épilepsie sur les 827 cas qui nous avaient été adressés avec un diagnostic clinique d'épilepsie. Et ainsi, l'électroencéphalographie n'a pu confirmer ce diagnostic clinique d'épilepsie dans 30.5%: 17% donnant un enregistrement absolument normal et 13.5% donnant des anomalies de nature non-épileptique. La balance des cas non-épileptiques, représentant des psychoses variées ou d'autres syndromes neurologiques, au nombre de 1,373, a donné un graphique épileptique dans une proportion de 10%. (Tableau no II)

Ces chiffres correspondent d'assez près aux statistiques d'autres auteurs. Gibbs, Gibbs & Lennox ont rapporté en 1943 que l'examen électroencéphalographique de routine aurait confirmé un diagnostic clinique d'épilepsie dans 38% et aurait présenté une certitude d'épilepsie dans 20% supplémentaire. Ceci donne un total de 58% tandis que nous avons confirmé de façon certaine dans une proportion de 69.5%.

Ces mêmes auteurs auraient de plus découvert des EEG parfaitement normaux dans 13% des cas d'épilepsie clinique alors que nous en avions 17%. En définitive, Gibbs conclut que l'examen électrographique n'a été d'aucune valeur dans 42% des cas d'épilepsie clinique alors que nous avons trouvé des résultats normaux dans 30.5% de ces cas d'épilepsie clinique.

COMMENTAIRES

On pourra se demander la raison de cette absence de confirmation d'une épilepsie clinique dans 30% des cas. Plusieurs explications sont plausibles. Souvent, le patient n'a pas cessé sa médication anticonvulsivante depuis assez longtemps. Il semble que les barbituriques aient la faculté de saturer le système durant un temps assez prolongé et qu'ainsi leur effet inhibiteur puisse agir durant plusieurs jours après la cessation même totale de tout médicament.

TABLE I

CLASSIFICATION GENERALE

2,200 électroencéphalographies	{	576 (26%): activité épileptique
		1,624 (74%): pas d'activité épileptique

*Conférence faite au bureau médical de l'hôpital Saint-Jean de Dieu le 25 janvier 1957.

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TABLE II

CONFIRMATION EEG DE LA CLINIQUE

827 cas d'épilepsie clinique	{	576 (69.5%): confirmés électrographiquement	{	17% normaux
		251 (30.5%): non confirmés électrographiquement		13.5% anomalies non-épileptiques
1,373 autres syndrômes non épileptiques	{	10%: activité épileptique EEG		

Par ailleurs, il importe souvent d'évaluer le moment propice où la crise apparaît: soit au moment de "l'endormissement" naturel, selon l'expression de Gastaut, i.e. à la phase de transition initiale entre l'état de veille et la période débutante du sommeil. C'est précisément à ce moment qu'apparaissent les trains d'ondes lentes entrecoupées de plus en plus fréquemment par des fuseaux d'ondes rapides de forme aiguë à 14/sec.

D'autres patients ne déclancheront leur crise épileptique qu'à la phase terminale du sommeil, au moment où se fait la transition, en sens inverse, du sommeil à l'état d'endormissement, ou, plus tard, de l'état d'endormissement à l'état de parfaite conscience.

Il est donc de première importance d'observer le patient et de noter le moment le plus usuel de sa crise afin d'en faire mention sur la requête d'EEG. Munis de ces observations cliniques rigoureusement contrôlées, les techniciens sauront alors si l'examen EEG doit se faire à l'état de veille ou sous sommeil naturel, ou même si on doit produire artificiellement le sommeil afin d'en doser l'intensité en vue de déclancher les décharges épileptiques au moment de l'enregistrement.

Ces seules raisons énumérées suffisent peut-être à expliquer jusqu'à un certain point, la proportion assez impressionnante des cas d'épilepsie clinique non confirmée par l'EEG.

En deuxième lieu, nous devons admettre que l'enregistrement cortical des centres cérébraux peut fort bien être apparemment muet ou ne montrer aucune anomalie en surface alors que l'activité électrique des centres profonds sous-corticaux donneraient des bouffées d'ondes épileptiques incontestables. Ce phénomène a été démontré de façon péremptoire à la dernière Réunion de l'Association des Electroencéphalographistes de l'Est à Ste-Adèle en mars 1956.

On avait collé des électrodes à la surface du crâne du patient tandis qu'on avait aussi enfoncé quelques électrodes en profondeur, en pleine substance cérébrale. L'enregistrement simultané de la surface corticale et des centres profonds était des plus probants. En surface, ondes rythmiques normales ou presque,

tandis qu'en profondeur, dans la même zone cérébrale, les décharges épileptiques étaient continues. C'est exactement l'image d'une masse d'eau où les courants et les tourbillons sous-marins existent sans en troubler la surface.

Ces constatations ont d'ailleurs été faites par d'autres auteurs et Gastaut rapporte que, sur 300 cas où il a utilisé la réactivation cardiazolique, selon sa technique, il aurait observé 29% de ces cas où il n'existait pas de décharge épileptique pendant le déroulement des crises cliniques.

Il en conclut, que ceci n'implique pas nécessairement l'absence d'activité épileptique mais qu'on peut supposer qu'une décharge se développe quelque part ailleurs dans le même temps sans se manifester au niveau des électrodes corticales. Dans 71% des cas restants, la crise clinique s'accompagne d'une décharge électrique caractéristique variable d'un sujet à l'autre et même d'une crise à l'autre.

Ces considérations semblent ainsi se rapprocher sensiblement de notre pourcentage et expliquent le fait que 30.5% des cas d'épilepsie n'ont pu être confirmés de façon péremptoire par l'EEG. Sur ce 30.5% il n'en reste pas moins que 13.5% donnait des anomalies variées, paroxystiques ou continues, mais insuffisamment évidentes pour en affirmer la nature épileptique. Il se peut que ces irrégularités de l'activité cérébrale n'étaient que la réflexion de véritables décharges électriques siégeant dans les centres profonds des hémisphères.

EPILEPSIE LOCALISEE

Une fois ces constatations générales établies, il serait intéressant d'étudier en détail les localisations corticales les plus fréquentes rencontrées dans ces 576 cas

TABLE III

576	296 (51.5%) = Epilepsie localisée	Centrale:	43 cas (7.6%)	
		Frontale:	54 cas (9.5%)	
		Insula:	6 cas (1.0%)	
		Occipitale:	8 cas (1.4%)	
		Pariétale:	14 cas (2.4%)	
		Temporale:	171 cas (29.6%)	{ Dr.: 75 (43.9%) BiT. 16 (9.3%) G.: 80 (46.8%)
576	280 (48.5%) = Epilepsie non-localisée	Centrencéphalique:	264 cas (45.8%)	{ idiopath. 108 (41%) non " 156 (59%)
		Généralisée:	1 cas (0.2%)	
		Myoclinique:	8 cas (1.4%)	
		Thalamus et 3e ventricule:	2 cas (0.3%)	
		Tige cérébrale:	5 cas (0.8%)	

(tableau no. III). Parmi les foyers épileptiques localisés découverts à l'EEG, il ne fait aucun doute que la localisation temporale est de beaucoup la plus fréquente puisqu'elle survient dans une proportion de 29.6%. Cette localisation temporale a toujours semblé dominer surtout chez les patients qui présentent des réactions psychiques anormales en plus de leurs crises épileptiques. Nous avons d'ailleurs étudié ce problème en 1951, lorsque j'avais eu l'honneur de présenter un travail sur ce sujet des localisations temporales chez les patients mentaux. Cette étude comportait 282 cas d'épilepsie clinique où nous avions confirmé une activité épileptique électrographique dans 72.6% des cas. Dans la fragmentation de ces enregistrements épileptiques, il y a eu 21.3% de ces cas qui étaient localisés à un lobe temporal ou aux deux lobes temporaux. Ceci se rapproche nettement des statistiques présentes où la tabulation se fait sur 827 cas d'épilepsie clinique qui nous ont été adressés.

Nous avons alors émis l'hypothèse, après de nombreux auteurs, tels que Keschner, Bender et Strauss, que les lobes temporaux, dans certaines manifestations psychiques, joueraient un rôle primordial. Dans ce travail nous avons trouvé que le foyer épileptogénique siégeait dans l'hémisphère dominant dans 70% des cas présentant des réactions de violence, tandis que 71% des cas de dépression mélancolique présentaient un foyer épileptogénique dans l'hémisphère droit. Plusieurs auteurs ont antérieurement étudié les anomalies électriques des lobes temporaux chez les psychotiques. On a longuement discuté sur la présence de foyers nécrotiques de l'hippocampe chez certains épileptiques au point que la question demeure encore aujourd'hui de savoir si cette zone nécrotique de l'hippocampe serait la cause de l'épilepsie ou en serait la conséquence. Cette hypothèse peut être valable dans les cas où le foyer électrographique varie souvent de la portion antérieure à la région postérieure du lobe temporal. Elle peut difficilement être admise, par contre, lorsque les inversions aiguës de phase sont toujours localisées à l'une des trois électrodes placées sur ce lobe temporal.

Il faudrait aussi considérer longuement la forme des ondes paroxystiques recueillies par l'EEG. De plus, il faudrait noter la différence existant entre les décharges épileptiques de l'EEG et celles recueillies par l'E.CoG. Ceci déborderait considérablement du cadre de cette étude statistique. Nous vous suggérons la lecture d'un travail important de Henri Gastaut, publié dans la Revue Neurologique, no 5, 1er semestre 1953.

Mais revenons plutôt à nos considérations statistiques en disséquant un peu les 171 cas de localisation temporale du foyer épileptogénique.

TECHNIQUE

Tous les patients ont été enregistrés selon la technique ordinaire. L'EEG se fait à l'état de veille, le patient ayant été sevré de barbituriques au moins 5 jours avant l'enregistrement, en autant que la chose est possible. Les recherches monopolaires du début se font en prenant les électrodes du scalp en dérivation avec le lobule de l'oreille. Cette électrode de l'oreille, supposée inactive, sert de référence. Tous les patients sont soumis à l'épreuve de l'hyperpnée durant au moins trois minutes suivie d'une phase de repos de deux minutes. Puis les recherches bipolaires, d'électrode à électrode, suivent en interrogeant toute la surface corticale au moyen des 16 électrodes collées au scalp. Vers la fin de l'examen, qui ne dure jamais moins d'une heure, on fait une réactivation à la lumière. Cette photostimulation ou stimulation lumineuse intermittente peut parfois provoquer de véritables décharges épileptiques et même, comme le fait s'est produit quelques fois, de grandes crises convulsives. L'intensité de la réaction dépend évidemment

du seuil de tolérance du patient sinon de la localisation de la lésion dans les centres cortico-visuels.

Enfin nous faisons l'enregistrement des centres sous-corticaux au moyen de l'électrode naso-pharyngée qui recueille l'activité des surfaces ventrales des hémisphères également.

Ainsi donc, en suivant cette technique, nous avons pu localiser de façon évidente le foyer épileptogénique dans l'un ou l'autre des lobes temporaux chez 155 cas: 75 fois sur le lobe temporal droit et 80 fois sur le lobe gauche. Les 16 autres cas n'ont pu être définitivement latéralisés, les décharges étant toujours bilatérales synchrones ou asynchrones.

J'admets que dans ces derniers cas, nous devrions examiner de nouveau ces patients et faire de nouvelles explorations avec d'autres réactivations plus énergiques, telles que le métrazol intra-veineux à dose filée. Deux raisons nous en ont empêchés: en premier lieu, 28 patients n'auraient jamais présenté de crises convulsives cliniques et il nous semble contre-indiqué de risquer ainsi de déclencher artificiellement une crise convulsive ou de réveiller un foyer latent. Puis, étant donné que notre travail ne consistait jusqu'ici qu'à dépister les lésions épileptogéniques sans envisager le traitement chirurgical possible, il nous semblait inutile de soumettre ces patients à cette réactivation assez importante, sans but pratique.

Que dire des 28 cas ne présentant aucune crise épileptique et chez qui l'EEG a démontré un foyer épileptogénique temporal?

Les paroxysmes électrographiques étaient alors à peu près tous formés d'ondes lentes hypervoltées de très courte durée et pratiquement toujours synchrones sur les deux régions temporales. Très peu présentaient des ondes aiguës avec inversions de phase sur une seule région temporale.

Dans de pareils cas, les décharges temporales bi-synchrones ou asynchrones se multiplient durant l'hyperpnée et le patient accuse de vagues malaises de nature vago-sympathique. Il est étourdi, parfois éprouve une sensation de frisson, tremble légèrement et voit des points lumineux brillants sautiller devant les yeux. Tous ces phénomènes peuvent aussi bien être une manifestation d'un état hypoglycémique ou d'une alcalose provoquée. L'abaissement progressif du CO_2 dans les centres cérébraux par l'hyperventilation se produit chez certaines personnes dont le mécanisme de barrage hémato-céphalique est perturbé. Les signes cliniques déterminés par ce trouble métabolique sont les mêmes que ceux produits par une véritable lésion épileptogène au niveau du cortex cérébral.

Nous les avons donc classés parmi les enregistrements positifs, quoique nous croyons qu'ils devraient plutôt être considérés comme des patients susceptibles de présenter des manifestations épileptiques uniquement s'ils sont exposés à de telles perturbations des échanges oxycarbonés.

C'est peut-être la raison pour laquelle ces patients n'ont jamais eu de crises épileptiformes avant qu'on ait tenté cette réactivation par l'hyperpnée. Est-ce à dire que ces personnes deviendront nécessairement des épileptiques dans un avenir plus ou moins rapproché? Je ne le crois pas. Il peut s'agir ici d'une simple fragilité transitoire d'un état bio-chimique, au même point que l'hyperglycémie provoquée positive n'impliquant pas nécessairement un diagnostic de diabète.

D'autre part, quelques-uns de ces cas peuvent présenter de véritables crises épileptiformes à la suite d'un traumatisme cérébral bénin ou d'une infection aiguë ou même après un choc émotionnel assez important. La chose a été constatée assez fréquemment.

Quant aux autres épilepsies localisées à différentes zones corticales, la localisation la plus fréquente est assurément la région frontale où existait 9.5% des foyers épileptogéniques; peu après viennent les localisations centrales avec un pourcentage de 7.6%.

Ces localisations corticales sont basées sur la forme des décharges électriques notées sur le graphique. Elles sont constituées la plupart du temps par de grandes ondes aiguës et même des pointes ou l'association des deux, parfois donnant l'image du complexe ondes-pointes. Les inversions de phase sont indiscutablement toujours localisées à ces régions dans de pareils cas et c'est un moyen de diagnostic électrographique admis par tous les auteurs. Une petite minorité d'autres cas présentaient des paroxysmes d'ondes lentes à 3 et 4/sec., mais ces paroxysmes étaient toujours unilatéralisés à la même région dans les différentes explorations durant toute la durée de l'examen. Il semble admis, par tous les neuro-physiologistes que les ondes en pointes représentent l'irritation corticale par le foyer épileptogénique tandis que les ondes lentes seraient l'indice que ce foyer est situé dans les zones sous-corticales ou dans les centres plus médians. Ceci explique qu'il peut arriver qu'on ne puisse confirmer la présence d'une lésion épileptogénique par les autres moyens d'ordre neuro-chirurgical, tel que la pneumoencéphalographie ou l'artériographie cérébrale, suivant que la lésion siège à la surface corticale ou dans les centres sous-corticaux et non suffisamment volumineuse pour refouler de façon évidente les vaisseaux corticaux ou empiéter sur la lumière des ventricules cérébraux. Il se peut aussi que le foyer épileptogénique électrographique soit l'indication d'une anomalie microscopique de la région intéressée ou d'une simple atrophie corticale circonscrite. L'excision chirurgicale d'une telle zone atrophique se fait régulièrement et semble améliorer considérablement le syndrome chez ces patients.

EPILEPSIE CENTRENCÉPHALIQUE

Il ne faudrait pas passer outre le groupe le plus important, c'est-à-dire, les cas d'épilepsie centrencéphalique, représentant un pourcentage de 45.8% de tous les épileptiques électrographiques. Ce terme est récent et il a été utilisé par Wilder Penfield il y a quelques années et peut remplacer l'ancienne expression d'épilepsie diencéphalique. L'idée en est que le terme de diencéphalique semblait beaucoup trop limité pour expliquer tous les phénomènes cliniques qu'on rencontre dans de pareils cas. En effet, le diencéphale englobe la portion du plancher du troisième ventricule, les deux thalamus et la région infundibulaire. Ceci n'explique donc pas certaines manifestations d'ordre extra-pyramidal, tel que certaines secousses rythmiques ou certaines formes de mouvements anormaux qui prennent naissance dans les centres striés ou au niveau du système réticulé de la tige cérébrale. On a donc pensé que cette dénomination de centrencéphalique pourrait plus facilement englober toutes ces manifestations centrales. Dans cette épilepsie centrencéphalique il y en a une qui est caractéristique à l'EEG et qui doit garder le nom de "Idiopathique". Elle est constituée par des paroxysmes de grandes ondes lentes s'accompagnant de pointes et formant toujours le même complexe pointes-ondes ou ondes-pointes et dont la fréquence est pratiquement toujours de 3/sec. Ces paroxysmes très caractéristiques diffusent de façon synchrone dans les deux hémisphères et toujours vers la région antérieure, comme s'ils avaient pris naissance au niveau du noyau dorso-médian du thalamus. Ce terme d'épilepsie idiopathique n'a aucunement de similitude avec le même terme d'épilepsie idiopathique employé par les cliniciens dans les cas d'épilepsie sans cause apparente. On doit, dans ce cas, appeler cette épilepsie ou essentielle ou cryptogénétique. Il ne faut donc pas comprendre ce terme d'épilepsie idiopathique, décrit dans un compte-rendu d'EEG, comme étant une épilepsie d'origine inconnue ou insoupçonnée mais uniquement

comme une forme graphique bien caractéristique d'ondes-pointes à 3/sec. Ce nombre impressionnant d'épilepsie centrencéphalique se divise en idiopathique dans une proportion de 41% et en épilepsie centrencéphalique, sans les caractéristiques typiques de la précédente, dans une proportion de 59%. Ces cas sont encore très difficiles à expliquer et il n'est pas ici question de traitement chirurgical à cause de la localisation trop imprécise et surtout dans un endroit pratiquement inaccessible.

CONCLUSIONS

De toutes ces constatations statistiques que je viens de vous exposer, nous pouvons donc tirer les leçons suivantes: l'EEG même de routine, sans symptomatologie précise, peut donc faire découvrir un pourcentage d'environ 10% d'épilepsie chez des gens apparemment normaux. Ceci n'implique pas nécessairement que ce 10% deviendra épileptique mais il peut se faire que ces patients soient des épileptiques en puissance et qu'ils le deviennent en fait suivant les accidents de l'avenir. En deuxième lieu, nous avons donc confirmé électriquement une lésion épileptique dans 69.5% des cas qu'on nous a adressés et ceci est un pourcentage assez impressionnant si l'on en croit les statistiques des autres auteurs que j'ai mentionnés au début. Il reste que j'ai la ferme conviction qu'on pourrait encore l'améliorer si l'observation clinique des patients pouvait être plus suivie et si certaines réactions paroxystiques anormales de schizophrènes pouvaient être soupçonnées comme étant une manifestation d'épilepsie psycho-motrice au lieu d'une simple réaction psychique banale. Dans ce cas, le clinicien, qui demande un EEG, devrait clairement décrire ce phénomène paroxystique anormal en demandant d'éliminer par l'EEG toute manifestation électrographique d'activité épileptique et je crois qu'en fait il existe à date nombre de cas que nous avons classés définitivement comme psychose et qui manifestaient des réactions semblables. Nous avons donc classé ces malades comme des psychotiques ordinaires tandis que nous aurions dû indiquer que la question en litige chez ces malades était d'éliminer le phénomène épileptique. La statistique de confirmation d'épilepsie aurait sûrement été améliorée si nous avions catalogué ces malades ainsi.

En plus de ces considérations de hautes mathématiques et de classification nous devrions réfléchir longuement sur cet autre résultat des épilepsies localisées d'après les EEG; parfois, après deux ou trois contrôles, nous avons découvert 296 EEG de cette sorte (qui ne représentent peut-être pas 296 patients) et ce chiffre semble assez important pour se demander en définitive quelle sera l'évolution de ces patients. Avons-nous continué les recherches en vue d'améliorer ces crises? La médication appropriée a-t-elle été employée et les crises ont-elles diminué de fréquence avec telle médication? L'état général du patient a-t-il varié pour le mieux ou le pire? Le patient est-il même décédé? Toutes ces questions se posent dans nos esprits, au laboratoire, et nous serions anxieux de connaître le résultat de cet examen que nous avons fait. Si les autres recherches confirment ou non, notre opinion électrographique, nous aimerions le savoir. Si l'opération chirurgicale de ces cas a été tentée, quelles sont les constatations qu'on y a faites? Si le patient est mort quel a été le résultat de l'autopsie?

Toutes ces questions, à mon sens, devraient trouver réponse et nous pourrions ainsi établir de façon plus certaine la concordance anatomo-clinique avec nos résultats électrographiques. Ceci d'ailleurs se fait dans tous les centres de neuro-chirurgie et c'est à cette seule condition que l'EEG pourra rendre les services qu'on attend de cette nouvelle exploration cérébrale.

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Summary

This study deals with 2,200 electroencephalograms recorded in a mental hospital. We have found that 576 of these EEG's gave an epileptiform activity (26%) whereas 1,624 (74%) did not show any epileptiform activity.

Among the 576 epileptiform activity cases, 296 were of a localized form in one of the cortical areas and 280 were of a non localized form.

Among the localized forms the most important were the temporal localizations which could be equally divided in left or right temporal regions. Among the non localized forms, the outstanding ones were of the centrencephalic origin including the idiopathic type or the non idiopathic type.

The usual technique in the recordings comprises monopolar and bipolar explorations during rest and followed by reactivation by hyperventilation or photic stimulation and in some cases by gradual intravenous injection of metrazol. The explorations by the naso-pharyngeal electrode are routinely made in each case.

It is to be emphasized that on this total of 2,200 cases, 827 had been referred to us as clinical cases of epilepsy. These were confirmed only in 69.5% meaning that the EEG was of no value in 30.5%. These figures would compare rather sharply with those of Gibbs, Gibbs & Lennox in a study made in 1943, where they confirmed a clinical diagnosis of epilepsy in 58%. These authors concluded that the EEG was of no value in 42% of clinical epilepsy whereas we found that 30.5% were not confirmed in our study.

Among these cases that were not confirmed by the EEG, we suspect that we could still break down this figure by the cortical recording as we have seen in some recent publications that many of those silent scalp recordings could give paroxysmal epileptiform activity through a cortical or a depth recording. We have seen many examples of these subcortical paroxysmal discharges during a quiet recording of the surface.

We have also found that in some routine examinations among non-epileptic psychotics, we had about 10% of those cases that would show epileptiform activity. This would not necessarily mean that this 10% will absolutely give epileptiform seizures in the future but we might keep in mind that, even in a normal population, these cases might be susceptible of giving such abnormal seizures according to multiple exterior factors.

CAPILLARY RESISTANCE IN MONGOLISM

L. A. KERWOOD, M.D.¹

One of the most common causes of mental defect is Mongolism named by Langdon Down and later called generalized foetal dysplasia (Penrose 1949).

This group, most of whom function at the imbecile or idiot level of intelligence, constitute approximately 5% of all cases of institutionalised defective—In the Ontario Hospital School Smiths Falls—7.4% of the male and 5.9% of the female patients are of this type (out of a total of 1,274 patients).

The absolute incidence of this congenital condition at birth is not known but results of surveys by Jenkins (1933) and Malpas (1937) show that it is of the order of one in 600-700 births.

It is obvious from the above facts that this condition is one of great importance socially and economically quite apart from its inherent medical and biological interest.

Shuttleworth (1909) (quoted from Brousseau), held the view that "... they are in fact unfinished children, and their peculiar appearance is really that of a phase of fetal life . . . that some cause has depressed the maternal powers, and there has been a deficiency of formative force . . . Nearly one half of these children are the last born of a large family and in one third a pthysical history has been traced . . ." This view is of considerable interest for there is evidence that there has been a continued disturbance of development in fetal life at reasonably well defined times. It is also of interest because he mentions that the children came at the end of the child bearing period and the only definitely established etiological factor in the production of Mongolism is that of increased maternal age. Between the ages of 20-30 the risk of a mother having an affected child is rather less than 1 in 2,000 but thereafter, in each quinquennium, the risk is nearly three times that in the preceding period, (Penrose, 1954). The mechanism whereby increased maternal age brings about the development of this condition is not known. Jenkins (1933), quoted by Penrose (1950), drew attention to similarities in animal genetics where maternal age has an affect on the manifestation of hereditary conditions (e.g. polydactyly in guinea pigs) and Penrose (1940) suggested that a process similar to antigenic incompatibility might be possible, immunity developing with greater ease in maturer than in younger maternal tissues; but also cautioned that the process need not necessarily be a pathological one since the maternal foetal reaction could be similar to that seen in fraternal twins, which also occurred at a late maternal age.

Oster (1953) notes the onset of the menopause occurred at a markedly later date in many mothers of Mongols than in the general Danish population and it has been noticed by many observers that affected children are frequently conceived after cessation of the menses.

The influence of hereditary factors has been summarised by Penrose (1954) who has made the observation that in cases where the mother has near relatives who have produced affected offspring the maternal age at birth of the affected child is lowered, when compared with cases containing no near relative affected or those in which the relative affected is on the father's side. In discussing the influence of hereditary factors, Penrose summarises the position as follows: "The familial incidence is low, but the tendency of some mothers to be predisposed to have affected offspring seems demonstrable.

An interesting feature of this condition is the occasional appearance in mothers, sibs and near relatives—so-called micro-symptoms, e.g. fissured tongues;

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transverse palmar lines; high cephalic index; incurved little finger and special types of dermal ridge configurations on the hands and feet which are commonly associated with Mongolism.

Turpin & Caratzali (1933) observed that 8.5% of parents and 6.4% of sibs had "fissured tongues"—seen in 20-90% of Mongols above 5 years of age but only in 1% of the general population.

Turpin, Lejeune (1954) noted that transverse palmar flexion creases (present in 67% of cases and only .9% of general population,) occurred in 10% of mothers, 3.3% of fathers and 6.3% of sibs.

Unfortunately, however, many of these micro-symptoms are secondary affects, (e.g. the persistent plica foetalis due to relative smallness of the nasal bones) and many tend to vary according to the age at which the affected child is seen; some, like the tongue changes, not being present (or clearly seen) until late in infancy and others, like the plica foetalis, tending to disappear with advancing age.

Also such features as fissured tongues may be of different type and pathology and estimations as to the degree of fissuring and the presence of transverse palmar lines are largely dependent upon subjective assessment.

However, three objective measurements have been recorded: 1) the number of ridges between the a and b triradius (Fang 1950); 2) the presence of the third interdigital pattern, (Fang, 1950), and 3) that of the angle subtended at the triradius by the triradial points a and d (Penrose 1949-1950). These measurements show, in the near relatives of Mongols, above chance deviations in the direction of the values found in cases of Mongolism.

There thus appears to be evidence that near relatives of Mongols show tendencies towards some of the associated defects seen in the patients.

It is interesting that the dermal ridges are subserved by a double row of capillary tufts which duplicate their pattern in the dermis. Examination of these capillary arrangements in relationship to ridges and creases is currently being undertaken by the author.

Study of cases seems to show that there has been a disturbance in growth which takes place early in development.

Ford and Frumkin (1942) found evidence on the configuration of dermal ridges which, according to Cummins and Midlow (1943), take on their permanent patterns between the third and fourth month.

Ingalls, T. H. (1954) states that cleft palate occurs more frequently than chance expectation in Mongols and notes that fusion of the palate occurs at about the third month. He states that towards the end of the third month the nasal bones, (usually markedly underdeveloped in Mongol infants) are appearing and that the cardiac septum, frequently imperfectly fused, closes normally between the 12th and 14th week. The primordial middle phalanx of the fifth digit buds off between and proximal and distal phalanges in the 8th week. This phalanx is often much reduced in size and may be completely missing in affected children.

Benda insists that there is a constant anomaly of angulation in the basilar-sphenoid junction and suggests that this implies retardation of development between the 42nd and 57th day.

He also notes persistence of the foetal configuration of the central canal of the spinal cord; normally it assumes definite shape and size by the fourth month.

Lowe (1949) in an extensive investigation of the eyes in Mongolism described characteristic arcuate lens opacities, due, he believes to abnormal

hypoplastic capillaries, which are formed at 8½ weeks. He notes that the characteristic speckled iris is also due to vascular disturbance and suggests that "the disturbance which produces the abnormalities in the vascular system could probably determine anomalies in other developing structures. The cause of this disturbance is probably the cause of Mongolism itself." He also mentions the interesting fact that the eyes were surprisingly little affected during the vulnerable organogenetic period and that cases showing anophthalmos, micropthalmos, orbital cysts or choroidal colobomata were "unexpectedly rare".

Evidence so far presented shows that the process involved affects many developing systems and must extend over a considerable period of foetal development, i.e. from anomalous basi-sphenoid at six weeks through to the fixation of the dermal ridges, (end of 16th week).

Penrose has recently postulated that the foetus requires some substance necessary for growth during the first 12 weeks and that the need for this substance varies with its own genetic constitution and further that the maternal needs for this substance are similarly determined. He continues, "... The substance, 'X', of which there is a deficit (or excess) ... could be a growth promoting (or retarding) hormone or vitamin ..." and mentions the work of Giroud (1954) and others on the critical requirements of pregnant animals for various vitamins to ensure the production of normal offspring.

Studies of encephalomalacia in chicks due to vitamin E deficiency, Henrik Dam (1943), are of interest particularly as hyaline thrombosis of capillaries are the primary cause of resultant necrosis.

It appears therefore likely that there is a period during which some substance (such as Penrose postulates) is present in the foetus in critical concentration, and that this substance will permit the development of organs which are in a certain stage of development (or, if toxic, inhibit them).

Various organs are susceptible to the substance to differing degrees dependent upon the genetic constitution of the individual. It appears that in some developing organisms the adverse environment persists for a sufficiently short time or is sufficiently mild that no serious pathology is produced and the only evidence of there having been such a potentially damaging process is seen in changed characteristics of the dermal patterns or a tendency to produce a fissured tongue or the abnormally long persistence of the plica foetalis or other micro-symptoms.

In some cases, however, the damage is irreversible, as in the production of arcuate lens opacities, hypoplasia of the cerebellum and pons and lack of differentiation of the cell layers of the cortex, and, as well as producing various minor effects, a permanently disabled foetus results which is ultimately born as a Mongol.

It is of interest to determine whether the Mongol is a result of noxious influences which are temporally the same as those which occur in his more fortunate sibs, who escape the full damaging effect; or whether it is a question of intensity which matters. A careful search for co-relations of symptomatology in patients and of micro-symptoms in sibships is being explored with this end in view. In this context it is interesting to note that, according to most observers, there are constant defects in the teeth in Mongols which are abnormal in shape and size or entirely missing. Whether dental defects are common in sibs and parents I do not know — they have not been, so far as I know, ever mentioned. This may be significant because the process of ossification begins at the fifth month and thus it appears possible that in the Mongol the 'pathological' environment continues longer — it may of course be more intense also.

We have already noted that in the case of the eye and lens defects there is

evidence of defective capillary formation; in the development of the teeth it is noted that as a preliminary to the definitive shape of the tooth being laid down numerous capillaries are formed, as indeed they must be in order to supply increasing nutrients (and remove possible toxic metabolites) wherever there is an acceleration of growth.

It would appear possible that the site of action of the disturbance might well be at the capillary tissue fluid level; that either the capillaries, in specific sites, are abnormal or that the mechanism for diffusion of essential metabolites (or toxic products) was defective. Lowe suggests that the capillaries are implicated in the developing lens and iris and it is interesting to note that many other anomalies occur during the 'neofœtal' period when placentation is being established. The placenta, essentially a capillary mechanism, might be involved.

Oster (1953) noted that in 71 cases of Mongol birth the placenta was reported as "loose and patchy" in 11. In 12 there were found "tattered membranes or rupture" and in 10 white infarcts were seen. He notes, however, having dismissed these findings as "not arguing in favour of the view that poor blood supply to the embryo is the cause of the defect," that "the stated reports constitute . . . routine descriptions . . . but do not give an account of the results of thorough systematic investigations."

Such investigations may well be worth undertaking.

The disturbance of growth continues after birth of the affected child.

A post natal development of great interest is seen in the tongue which at birth is usually reported as normal. During the first two years of life rounded raised swellings develop, at first at the tip and on the lateral margins and later progressing backwards over the anterior 2/3. There are so-called "hypertrophic fungiform papillae" thought to be due to tongue-sucking. Microscopy during life and serial photography studied here show that actually these swellings are small 'islands' of filiform papillae which progressively lose their horny epidermal covering and appear translucent and oedematous. In these elevations large leashes of capillaries may easily be seen and they appear distended and irregular in outline. It is interesting at this point to note that the mother and sister of a case here both have fissured and hypertrophied tongues and that these developed at about the 11th or 12th year of life.

The capillaries of the skin-nail fold were studied in Mongols by Powdermaker (1929) who noted that they were abnormal in shape and that the sub capillary venules were primitive in character.

Examination of subjects here confirms her findings. A common form of capillary loop seen in these patients is an irregular open loop with many tortuosities which is but rarely seen in normal controls, (Bosley, G. M., 1955).

Examination of mothers and sibs for this pattern is currently being planned.

Whilst doing venupuncture on some Mongol children I noticed that multiple petechial haemorrhages were produced shortly after the tourniquet was applied, a phenomenon which I had not observed in other patients. I felt that an examination of the capillary resistance might be of interest. Accordingly the following investigation was undertaken:

Method

The negative pressure method for determining capillary resistance was the same as that used by Robson & Duthie (1950) (1), and was based on the method of Scarborough (1941) (3). The apparatus, with a perspex cup with inside diameter of 20 mm, and incorporating a x10 lens and an endoscope bulb, was constructed according to details supplied by Robson & Duthie in their article.

The value of capillary resistance was arbitrarily expressed as the negative pressure which, when applied to the skin for thirty seconds, produced between one and ten haemorrhagic petechiae, observed under the lens. Since, in agreement with Robson & Duthie, it was found that when a certain negative pressure produced ten petechiae, a negative pressure of 50 mm Hg less produced none or one, it was decided for comparative purposes to modify our results by subtracting 10 for every two petechiae above one from the pressure recorded in mm Hg. For example, a pressure of 200 mm Hg producing 3 petechiae was taken as a critical petechial pressure of 190 mm Hg. The pressure required to produce between one and ten small haemorrhages was found by trial and error tests in immediately adjacent areas of skin by increasing or decreasing the applied pressure by 50 mm Hg according to the result obtained in the previous trial. Estimations were made on the volar aspect of the left forearm, in both the lateral and medial regions one inch below the flexure of the elbow.

In spite of the fact that there are a great number of nutritional hormonal, physical and chemical factors which alter the capillary fragility it was decided to investigate the problem in a series of institutional patients. This series was composed of 28 male and 18 female patients who were resident in Cell-Barnes Hospital, Hertfordshire. These patients investigated were free of gross physical infection and had no evidence of pulmonary tuberculosis seen on x-ray during the last year before the examination. They were all receiving a diet adequate in calories and vitamins and were all receiving supplementary ascorbic acid, (50 mgms pr day), for a minimum of a month before the examination took place. Examinations were done at the same hour each day and were complete within two weeks. None of the patients were unduly apprehensive and they all cooperated well. The control group were 30 male and female nursing staff in a near-by hospital. (Figures were kindly supplied by Mr. Feetham).

The patients examined were 18 female and 28 males. The mean age for the female patients was 17.5 years with a range of 2 to 36 years.

There were 28 male cases with a mean age of 17.5 with a range of 5 to 45 years.

The control group comprised of 30 males with a mean age 41.3 and an S.D. of 7.5 and 30 females with an average age of 36.6, S.D. of 10.8.

Results

According to authorities on the subject there is little change in capillary fragility after the first few months of life and figures given by Dollendorf (1933) show no significant variation with age between the fifth year of life and 65 years. No effect of age could be seen in the groups studied as is apparent from tables I and II.

TABLE I
MALE PATIENTS: MEAN 'PETECHIAL PRESSURES' BY AGE GROUPS

	Medial Elbow	Lateral Elbow
Mean for whole sample. n=28—mean age 19.2 years....	157.3	135.7
Mean for cases aged 16 years and under—n=14 mean age 12 years.....	157	139
Mean for cases aged 17-30 years n=9.....	156	135
Mean for cases 31 years and over n=5.....	158	123

Accordingly it seems reasonable to compare our cases and the control group.

There did not appear to be any difference dependent upon the sex of the subjects as will be seen from table III.

TABLE II
FEMALE PATIENTS: MEAN 'PETECHIAL PRESSURE' BY AGE GROUPS

	Medial Elbow	Lateral Elbow
Mean for whole group. n=18—mean age 17.5.....	163	138
Mean for patients aged 16 or below. n=1— mean age 8.09.....	162	132
Mean for patients aged 30 and above. n=7.....	164	147

TABLE III
'MEAN PETECHIAL PRESSURES' IN MONGOLS AND SEX DIFFERENCE

	Male Cases (28)		Female Cases (18)	
	Mean Pressure	Range	Mean Pressure	Range
Lateral Elbow.....	135.7	70-230	138	95-240
Medial Elbow.....	157.3	80-250	163	90-250

TABLE IV
NEG PRESSURE REQUIRED IN FEMALE PATIENTS

Lateral Region m=138.6 (S.D.) ² =1777.66			Medial Region m1=63.3 (S.D.) ² =1476.47		
X	X-M	(X-m) ²	X	X-M	(X-M):
140	+ 1.4	.96	195	+31.7	1004.89
150	+ 11.4	129.96	190	+26.7	712.89
240	+101.4	10281.96	250	+86.7	7516.89
100	- 38.6	1489.96	140	-23.3	542.89
120	- 18.6	345.96	145	-18.3	334.89
95	- 43.6	1900.96	120	-43.3	1874.89
140	+ 1.4	1.96	170	+ 6.7	44.89
195	+ 56.4	3180.96	200	+36.7	1346.89
60	- 78.6	6177.96	145	-18.3	334.89
145	+ 6.4	40.96	195	+31.7	1004.89
120	- 18.6	345.96	90	-73.3	5372.89
140	+ 1.4	1.96	140	-23.3	542.89
130	- 8.6	73.96	150	-13.3	176.89
140	+ 1.4	1.96	150	-13.3	176.89
200	+ 61.4	3769.96	200	+36.7	1346.89
90	- 48.6	2361.96	120	-43.3	1874.89
150	+ 11.4	129.96	190	+26.7	712.89
140	+ 1.4	1.96	150	-13.3	176.89
2495		30220.28	2940		25100.02

30 controls: m = 192
(standard deviation)² 817.96
t test yields CR of 4.67
P=greater than .001

30 controls: m = 202
(standard deviation)² 761.76
t test yields CR of 2.76
P is greater than .01

TABLE V
NEG. PRESSURE REQUIRED IN MALE PATIENTS

Medial Elbow Region (S.D.) ² = 2099.04 m = 157.3			Lateral Forearm m = 135.7 (S.D.) ² 1345.32		
X	X-M	(X-M) ²	X	X-M	(X-M) ²
95	-62.3	3881.29	70	-65.7	4316.49
200	+42.7	1823.29	150	+14.3	204.49
150	- 7.3	53.29	130	- 5.7	32.49
250	+92.7	8593.29	150	+14.3	204.49
145	-12.3	151.29	155	+19.3	372.49
155	- 2.3	5.29	145	+ 9.3	86.49
145	-12.3	151.29	135	- 0.7	.49
175	+17.7	313.29	145	+ 9.3	86.49
80	-77.3	5975.29	100	-35.7	1274.49
80	-77.3	5975.29	75	-60.7	3684.49
150	- 7.3	53.29	135	- 0.7	.49
145	-12.3	151.29	120	-15.7	247.49
150	- 7.3	53.29	130	- 5.7	32.49
245	+87.7	7691.29	200	+64.3	4134.49
100	-57.3	3283.29	90	-45.7	2088.49
250	+92.7	8593.29	220	+84.3	7106.49
145	-12.3	151.29	100	-35.7	1274.49
140	-17.3	299.29	130	- 5.7	32.49
150	- 7.3	53.29	150	+14.3	204.49
140	-17.3	299.29	150	+14.3	204.49
150	- 7.3	53.29	135	- 0.7	.49
240	+82.7	6839.29	230	+94.3	8892.49
150	- 7.3	53.29	130	- 5.7	32.49
145	-12.3	151.29	120	-15.7	247.49
150	- 7.3	53.29	135	- 0.7	.49
150	- 7.3	53.29	100	-35.7	1274.49
195	+37.7	1421.29	150	+14.3	204.49
135	-22.3	497.29	130	- 5.7	32.49
4405		36323.72	3810		35273.72

controls (m=30) mean = 184.0 (standard deviation) ² 1211.04 t test yields CR of 3.65 P = .001	controls m=30 mean = 184.0 (standard deviation) ² 1211.04 t test yields CR 3.6 P = .001
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Table IV showing the negative pressure (in millimeters of mercury) producing petechial haemorrhage on the forearm, volar aspect in 18 female Mongols.

Table V showing the negative pressure (in mms of mercury) producing petechial haemorrhage on the forearm, volar aspect in 2 male Mongols.

As will be seen from the tables there is a significant reduction in the negative pressure required to produce petechial haemorrhage on the volar aspect of the forearm in both male and female Mongols. There does not appear to any obvious relationship to age or sex.

Summary

The incidence of institutional samples and the frequency of birth of mon-
golism is mentioned. A brief review of hypotheses concerning the possible
etiology and genetic factors which may be implicated in this disorder. Mention
is made of the appearance of microsymptoms in relatives with particular
reference to dermatoglyphic patterns. The difficulty of making objective
measurements of some of the associated defects is noted. The work of Ingalls

on the temporal aspects of the growth disturbances is mentioned. Lowe's observations on the characteristic lens opacities and speckled irides and his suggestion that an underlying vascular disturbance is likely to be responsible for these findings are noted. Attention is drawn to his observation of the rarity of defects which would suggest disturbance during the organo-genetic period. A suggestion is made that the causation of mongolism must be temporarily extended over a considerable period of foetal development, and Penrose's postulate for foetal requirements of "x" substance is quoted.

Experiments with maternal avitaminosis are mentioned. It is suggested that there may be disturbance of growth due to abnormalities in transfer of substances to and from the capillary system to the surrounding tissue fluids. It is suggested that the so-called hypertrophic fungiform papillae of the tongue are a post-natal development due to localized oedema and it is postulated that this may be associated with capillary abnormalities. A clinical observation that petechial haemorrhages occur readily in mongolian children is noted and the results of an experiment measuring the resistance of the capillary wall to negative pressure is described. The results of these experiments demonstrate a significant reduction in capillary resistance in male and female institutionalised mongols and some suggestions are made as to further studies.

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Résumé

L'auteur établit l'incidence du mongolisme dans les institutions et la fréquence des naissances de sujets mongols et fait une brève revue des hypothèses étiologiques et des facteurs génétiques qui semblent s'appliquer à cette entité. La présence de symptômes mineurs chez les parents est signalée, particulièrement des manifestations

"dermatoglyphiques". Il est difficile de mesurer avec précision un certain nombre de troubles associés. Le travail de Ingalls mentionne les retards de croissance. Lowe a observé des opacités caractéristiques du cristallin et des taches de l'iris et a émis l'hypothèse qu'un trouble vasculaire est probablement responsable de ces anomalies. Il y a peu de symptômes qui suggèrent un trouble de la période organogénétique. La condition causale du mongolisme agirait durant une importante période du développement fœtal. Il est à retenir que Penrose a postulé une substance inconnue pour le développement de cette entité morbide.

Des études sur l'avitaminose chez la mère ont été faites. Une hypothèse voudrait que le trouble de croissance soit dû à des anomalies dans le cheminement des substances dans les deux sens, du système capillaire aux liquides baignant les tissus. L'hypertrophie fungiforme des papilles de la langue se développerait après la naissance à cause d'un œdème localisé, dû à une anomalie capillaire associée. L'observation clinique révèle la présence d'hémorragie pétéchiale chez les enfants mongols et l'expérimentation a démontré le comportement des parois capillaires soumis à une pression négative, soit une diminution importante de la résistance capillaire chez les mongols masculins et féminins hospitalisés. L'auteur offre des projets d'étude subséquents.

**CANADIAN PSYCHIATRIC ASSOCIATION
ANNUAL MEETING**

20th - 21st, June 1958

Halifax, N.S.

(Preliminary Programme)

Friday, 20th June 1958:

"CONTINUITY OF CARE OF ADULT MENTALLY ILL"

Chairman—Dr. D. C. A. Cleland

"THERAPEUTIC ASPECTS OF THE MENTAL HOSPITAL ORGANISATION"—Dr. J. Clancey

"MULTI-DISCIPLINARY STUDY OF SPONTANEOUS AND HABITUAL ABORTION"—Research Report by Dr. Tupper

Friday Afternoon:

ANNUAL BUSINESS MEETING C.P.A.

Friday Evening:

DINNER and DANCE

Saturday Morning, 21st June 1958:

"THE PARANOID PATIENT"—panel discussion

Chairman—Dr. R. R. Prosser

"AN HOLISTIC THEORY OF SCHIZOPHRENIA"

Dr. G. J. Sarwer-Foner

"SHORT TERM PSYCHOTHERAPY—Author to be announced

THE POSSIBLE DREAM INDUCING CAPACITY OF THE WHOLE ROOT OF RAUWOLFIA SERPENTINA*

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The purpose of this communication is to report on the increase in dreams during the administration of the whole root of rauwolfia serpentina (Raudixin) in two patients under intensive psychotherapy.

Our attention was directed to this problem when hypertensive patients were first treated with Raudixin. In these studies nightmares were reported as a "side effect" (1, 2). This phenomenon was reported later during reserpine administration to mentally ill patients (3). It was not made clear in these reports whether dreams were anxiety dreams (Angsttraum) or nightmares (Alptraum) as differentiated by Jones (4).

Considering the dream as a representative of psychic activity during sleep, and not as a side-effect, it was thought that the investigation of this problem would be of some interest. It was assumed that dreams were, as Freud stated, "the royal road to a knowledge of the unconscious activities of the mind" (5), and that production of dreams in certain respects might aid the uncovering of unconscious activities.

Method

Two unmarried, female patients of the same age (31), suffering from anxiety neurosis were seen for a period of about 6 months in psychotherapy. Subsequently they were put on the following schedule of drug administrations: a) First Patient — 4 periods of Raudixin and 4 periods of placebo, each period consisting of an average of 10 sessions over a period of 30 days. In addition two other periods were considered during which the patient received no pills, and consisted of 10 and 12 sessions over a period of 34 days respectively. b) Second Patient — 3 Raudixin periods of an average of 8 sessions each over a period of 30 days; one Raudixin period of 3 sessions each over a period of 10 days; 3 placebo periods of an average of 8 sessions over a period of 30 days; and 2 no-pill periods of 12 and 9 sessions each over a period of 34 days. During all these periods the quantitative and the qualitative aspects of reported dreams were noted.

The dosage of Raudixin was 800 mgm daily. It was supplied as red pills, while the placebo was white. The main reason for the selection of these 2 cases was the absence of recollected dreams during the previous 6 months of therapy. During the drug administration psychotherapy was continued as before. Patients were told that the action of the medication was dependent on the individual cases and it might have either no effect, or some untoward effects. No specific enquiry about the existence of dreams were made during the treatment.

Results

The following observations were made in regard to different aspects of dream formations:

A. Formal Aspects

(a) There was a considerable increase in dreams during Raudixin periods. This was particularly marked in the second patient, who had no dreams during

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*Presented in part at the 2nd Divisional Meeting of the American Psychiatric Association, Montreal; November 10th 1956.

²The whole root of rauwolfia serpentina (Raudixin) was supplied by E. R. Squibb & Sons.

The author acknowledges his deep gratitude to Dr. R. A. Cleghorn for his valuable suggestions and to Dr. W. Clifford Scott for his critical comments and valuable suggestions.

TABLE 1. COMPARISON OF NUMBER OF DREAMS DURING RAUDIXIN AND PLACEBO THERAPY

	No. Pills	Raudixin	Placebo	Raudixin	Placebo	Raudixin	Placebo	Raudixin	Placebo	No. Pills
Case 1.										
No. of Sessions	12	11	11	9	10	10	10	11	10	10
No. of Dreams	2	6	0	11	3	18	2	19	2	0
Case 2.										
No. of Sessions	12	8	9	8	6	9	9	3	-	9
No. of Dreams	0	2	0	3	0	8	0	4	-	0

placebo periods. Table I. demonstrates the number of dreams during the three periods of observation. The increase is noted clearly in patient 2 who did not dream at all during the placebo or no-pill period. It should be pointed out also that the dreams kept increasing in number in each Raudixin period.

(b) There was an increase in the clarity and the vividness of dreams during Raudixin periods. Both patients reported spontaneously after the third trial that they dreamt more while they were taking the red pills (Raudixin), and their dreams were more vivid. Patient 1 reported: "I have become attentive to the effects of these pills... they made me tired at the beginning, then it seems to me that my dreams are clearer, I remember them better when I wake up". Later during the control period she brought out: "It is funny even when I dream now I can't remember a thing when I wake up... when I was taking those pills, the red ones, I dreamt almost every night". The other patient had a similar experience. The patients' questions about the validity of their observations were answered equivocally, e.g. "I don't know, we have to see".

(c) There were no nightmares with the three characteristics described by Jones, namely the sensation of a heavy weight on the chest, inability to move and breathe (4).

Patient 1 reported three anxiety dreams during Raudixin periods, two of which were associated with undisguised death wishes against the mother in the manifest content. There was one anxiety dream during the placebo periods.

Patient 2 had an anxiety dream on the third session after the beginning of the first Raudixin period. The dream was the first dream, remembered by the patient since the beginning of her treatment. On awakening this patient experienced a mild depressive episode. The dream consisted of a "dead body — a mummy, in the drawer. I had to get rid of it". Analysis of this dream revealed the death wishes directed to the therapist, realized by oral incorporation of him through pills. The depressive episode was patient's mourning about this fantasized introjected lost good object.

(d) In all periods there was no significant characteristic attributable to the kind of symbols, body feelings in dreams, dream screen, etc.

(e) There was no difference between the frequency of dreams divided, after Freud (6) into three categories of "intelligible", "bewildering" and "confused" in all periods. The small number of dreams during control periods did not allow a fair comparison with Raudixin periods.

B. Dynamic Aspects

An attempt was made to divide the dreams, as Freud had recommended, into three classes "according to their attitudes to wish-fulfillment" (6), i.e. "undisguised", "insufficiently disguised", and "disguised". Here again for comparison we were hampered by the absence of reported dreams during placebo

periods in patient 2, and their paucity in patient 1. However, the fact that patients dreamed more during Raudixin periods may be interpreted as an increased capacity for dream wish-fulfillment during the drug administration. The increase in dream formation could be seen, at least in part, as a manifestation of a decrease in ego defence systems, and relative emergence of unconscious processes. To take only one therapeutic aspect of this emergency of the repressed, and disregarding any other obvious functions of dreams and their interpretation, it should be mentioned that it served for partial uncovering of what appeared to be a marked resistance due to positive transference fantasies, particularly in patient 2, which seemed to have hampered the progress of treatment in certain respects. There was no evidence that the contents of dreams, manifest or latent, had any specificity during Raudixin periods and that day dreams were affected. Also, there was no indication, as far as it could be determined, that the increase in dreams was a resistance. Patients dreamed more, i.e. some unconscious happenings, among them repressed feelings toward the therapist, were allowed to emerge, and hence could be analyzed.

Discussion

The foregoing data disclose that in the two patients reported here there appeared a significant increase in dreaming during Raudixin administration in comparison with placebo periods. This by no means proves that Raudixin possesses a "dreamogenic" capacity, but indicates a possibility. There are many objections that can be raised about this contention. One major point, among others, may be mentioned, namely, the role of suggestion in the formation of dreams. Attempts were made to be as neutral as possible in giving instruction about the administration of the drugs, to refrain from inquiring about dreams, and show any particular interest when patient reported a dream. However, it is possible that by subtle means such as unobserved interjections, attitudes, tone of voice, etc. patients were made aware of the therapist's interest in or wish for dreams and they dreamed for him.

It should be stated that the therapist knew the nature of the drugs, and it is possible that unconsciously he conveyed his wish for dreams during Raudixin periods. The possibility of drowsiness causing dreams should be discussed. It may be said that patients under the drug awoke slower, and because of this relatively prolonged light sleep they could remember their dreams better. Against this objection the following observations were noted: the patients felt drowsy only for a few days, and after the first week their sleep patterns appeared to have returned to the state without drugs; the appearance of dreams had no relationship to the time the drug was administered. It is not felt that the colour of the pills affected the outcome, but this will be controlled in future studies.

If Raudixin may be considered to have a "dreamogenic" influence, the problem how to explain this remains. Freud has said that "the dream work is under necessity of combining into a unity all instigations to dreaming which are active simultaneously" (8). These instigations are twofold: organic and dynamic. In the present study there appears to be a greater emphasis on organic factors than in ordinary dreaming because observations lead to the conclusion that during the administration of a substance with definite physiological activity the dreams were increased. The formulation should consider the effect of a physiological alteration on the dynamic systems of the mind, i.e. need-systems (drives, id) ego systems, and internalized external control system (super-ego). Theoretical formulations may be sought along the following lines. 1) The chemical substance may affect the drive or need systems rather than the ego

system. In order to avoid the dilemma of the relationship of organic to psychic, it seems safer to say that a chemical substance affects a drive rather than a defence. It is generally agreed, and Freud was the first to emphasize it, that the drives have an organic source. Physiological studies indicate that diencephalic area is the regulator of some of the basic needs. Recent evidence points to the possibility that rauwolfia alkaloids affect subcortical neuronal sets. Hence it can be inferred that Raudixin may affect the sources of drives, increases their intensity, allow them to emerge out of repression and break through the ego's mechanisms of defence, which are already partially in abeyance during sleep. The intensified impulses emerge, according to Freud in attempted wish-fulfillment. If we take the definition of wish as Freud has given (9) as the movement from unpleasure to pleasure, or, we may say, from accumulation to action, we could say that this movement was accelerated because of the alteration of the sources of drives. 2) Closely related to the above considerations it may be conceptualized that the chemical substance may affect the distribution of "the psychical intensity or energy" (10); that it produces an economical shift in the intensity of energy systems. This shift, in cathexis, it may be inferred, when affecting the super ego system, the censor, causes "relaxation" of it in sleep and allows the formation of dreams. This particular concept, which is the key for understanding of the economical principle of the mind, is closer to a physiological state and is conceivable in connection with the administration of an organic substance. The contention of a change in super-ego cathexis as a possible effect of Raudixin appeared a useful hypothesis in previous studies on the effect of rauwolfia derivatives on schizophrenic dynamic structure (12, 13).

Summary

To investigate the effects of the whole root of rauwolfia serpentina (Raudixin) on dream frequency, two neurotic patients under intensive psychotherapy received, during alternating periods, Raudixin (a total of 8 periods) and placebo (a total of 7 periods). Quantitatively the number of dreams was found to be considerably greater during the drug period. The dreams were used in a partial uncovering and overcoming of a marked resistance due to positive transference fantasies, which had hampered the progress of the therapy. Theoretically the apparent "dreamogenic" capacity of the drug could be understood as due to an alteration of the sources of drives, and a consequent economical shift in cathexis of mental energy.

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Résumé

Dans le but d'explorer les effets de la racine totale de la rauwolfia serpentina (Raudixin) sur la fréquence des rêves, deux névrotiques sous psychothérapie intensive reçurent alternativement du Raudixin pour un total de 8 périodes et un placebo pour un total de 7 périodes.

Les rêves furent considérablement plus fréquents durant les périodes sous médication au Raudixin et servirent partiellement à découvrir et à réduire une forte résistance alimentée par les machinations d'un transfert positif, qui avait d'ailleurs gêné la bonne marche de la psychothérapie.

Théoriquement les propriétés apparemment "onirigènes" de cette drogue semblent dépendre d'une altération des sources pulsionnelles et d'une déviation consécutive dans le processus de libération de l'énergie psychique.

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